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>
> Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).
>
> For related information see also *Astronautics*.

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>
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>
> For related information see also *34 Fluid Mechanics and Heat Transfer*.

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82 DOCUMENTATION AND INFORMATION SCIENCE **575**

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

83 ECONOMICS AND COST ANALYSIS **577**

Includes cost effectiveness studies.

84 LAW AND POLITICAL SCIENCE **577**

Includes space law; international law; international cooperation; and patent policy.

85 URBAN TECHNOLOGY AND TRANSPORTATION **578**

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.

For related information see also *Geosciences.*

88 SPACE SCIENCES (GENERAL) **579**

89 ASTRONOMY **579**

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS **580**

Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION **581**

Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design, Testing and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

92 SOLAR PHYSICS **589**

Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION **590**

Includes cosmic radiation; and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

GENERAL

99 GENERAL **590**

Note: N.A. means that no abstracts were assigned to this category for this issue.

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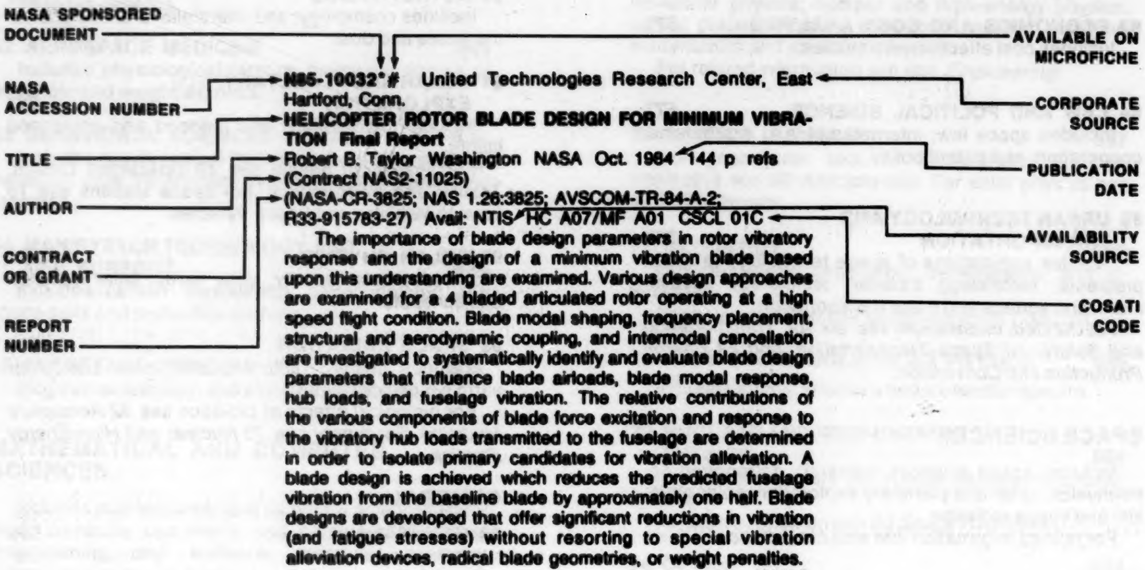
TYPICAL CITATION AND ABSTRACT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N85-10032*# United Technologies Research Center, East Hartford, Conn.
HELICOPTER ROTOR BLADE DESIGN FOR MINIMUM VIBRATION Final Report
Robert B. Taylor Washington NASA Oct. 1984 144 p refs
(Contract NAS2-11025)
(NASA-CR-3825; NAS 1.26:3825; AVSCOM-TR-84-A-2; R33-915783-27) Avail: NTIS HC A07/MF A01 CSCL 01C

The importance of blade design parameters in rotor vibratory response and the design of a minimum vibration blade based upon this understanding are examined. Various design approaches are examined for a 4 bladed articulated rotor operating at a high speed flight condition. Blade modal shaping, frequency placement, structural and aerodynamic coupling, and intermodal cancellation are investigated to systematically identify and evaluate blade design parameters that influence blade airloads, blade modal response, hub loads, and fuselage vibration. The relative contributions of the various components of blade force excitation and response to the vibratory hub loads transmitted to the fuselage are determined in order to isolate primary candidates for vibration alleviation. A blade design is achieved which reduces the predicted fuselage vibration from the baseline blade by approximately one half. Blade designs are developed that offer significant reductions in vibration (and fatigue stresses) without resorting to special vibration alleviation devices, radical blade geometries, or weight penalties.
M.A.C.

VOLUME 23 NUMBER 4 / FEBRUARY 23, 1985

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N85-12857 Arizona State Univ., Tempe.
LOW POWER LAMINAR AIRCRAFT STRUCTURES
Alex Strojnik 1984 215 p
Copyright. Avail: Issuing Activity

A method by which to build a safe, lightweight aircraft is presented. Aerodynamic loads, aircraft structural materials, spar design, and stressed skins are addressed. R.S.F.

N85-12858* National Aeronautics and Space Administration, Washington, D. C.
AERONAUTICAL ENGINEERING, A CONTINUING BIBLIOGRAPHY WITH INDEXES
Nov. 1984 153 p
(NASA-SP-7037(180); NAS 1.21:7037(180)) Avail: NTIS HC $6.00 CSCL 01A

This bibliography lists 546 reports, articles and other documents introduced into the NASA scientific and technical information system in October 1984. Author

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N85-12859*# CHAM of North America, Inc., Huntsville, Ala.
ANALYSIS OF PHYSICAL-CHEMICAL PROCESSES GOVERNING SSME INTERNAL FLUID FLOWS Progress Report, May - Jun. 1984
A. K. Singhal, S. F. Owens, T. Mukerjee, L. W. Keeton, and L. T. Tam 1984 12 p
(Contract NAS8-35970)
(NASA-CR-171247; NAS 1.26:171247; CHAM-4045/1) Avail: NTIS HC A02/MF A01 CSCL 01A

In order to aid the development of current and future SSME type engines, it is necessary to improve the understanding of basic issues related with physical-chemical processes of SSME internal flows. Accomplishments under each of the following specific objectives are described herein: (1) supplying a state-of-the-art CFD code and graphics package; (2) demonstrating code usage on SSME-related problems to NASA MSFC personnel; and (3) performance computations and analysis of problems relevant to current and future SSME's. R.S.F.

N85-12860*# Stanford Univ., Calif. Joint Inst. of Aeronautics and Acoustics.
A STUDY OF FLOW PAST AN AIRFOIL WITH A JET ISSUING FROM ITS LOWER SURFACE
A. Krothapalli and D. Leopold Jun. 1984 44 p refs
(Contract NCC2-198; Grant NAG2-111)
(NASA-CR-166610; NAS 1.26:166610) Avail: NTIS HC A03/MF A01 CSCL 01A

The aerodynamics of a NACA 0018 airfoil with a rectangular jet of finite aspect ratio exiting from its lower surface at 90 deg to the chord were investigated. The jet was located at 50% of the wing chord. Measurements include static pressures on the airfoil surface, total pressures in the near wake, and local velocity vectors in different planes of the wake. The effects of jet cross flow interaction on the aerodynamics of the airfoil are studied. It is indicated that at all values of momentum coefficients, the jet cross flow interaction produces a strong contra-rotating vortex structure in the near wake. The flow behind the jet forms a closed recirculation region which extends up to a chord length down stream of the trailing edge which results in the flow field to become highly three dimensional. The various aerodynamic force coefficients vary significantly along the span of the wing. The results are compared with a jet flap configuration. E.A.K.

N85-12861*# Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.
VISCOUS-INVISCID AERODYNAMIC ANALYSIS OF TWO-DIMENSIONAL THRUST AUGMENTORS
D. A. Tavella and L. Roberts Mar. 1984 44 p refs
(Contract NCC2-150)
(NASA-CR-177321; NAS 1.26:177321) Avail: NTIS HC A03/MF A01 CSCL 01A

A theory for the computation of two-dimensional thrust augmentor performance is developed. The flow field is assumed to be incompressible, of uniform density and statistically steady. The flow in and around the augmentor is assumed to consist of an outer, inviscid part and an inner, viscous part. The outer field is calculated analytically and then matched with the inner, viscous field, which is computed by means of integral methods. This form of analysis leads to a simple and economical approach, particularly useful for conducting parametric studies. The theoretical results are compared with recently acquired experimental data. Author

N85-12862*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
APPLICATION OF THE ONERA MODEL OF DYNAMIC STALL
K. W. McAlister, O. Lambert (Service Technique des Programmes Aeronautiques, Paris), and D. Petot (ONERA, Chatillon, France) Nov. 1984 65 p refs
(NASA-TP-2399; A-9824; AVSCOM-TR-84-A-3; NAS 1.60:2399) Avail: NTIS HC A04/MF A01 CSCL 01A

A semiempirical model to predict the unsteady loads on an airfoil that is experiencing dynamic stall, is investigated. The mathematical model is described from an engineering point of view, demonstrates the procedure for obtaining various empirical parameters, and compares the loads predicted by the model with those obtained in the experiment. It is found that the procedure is straightforward, and the final calculations are in qualitative agreement with the experimental results. Comparisons between calculations and measurements also indicate that a decrease in accuracy results when the values of both the reduced frequency and the amplitude of oscillation are large. Potential quantitative improvements in the accuracy of the calculations are discussed for accounting of both the hysteresis in the static data and the effects of stall delay in the governing equations. E.A.K.

N85-12863*# Vigyan Research Associates, Inc., Hampton, Va.
NATURAL LAMINAR FLOW AIRFOIL DESIGN CONSIDERATIONS FOR WINGLETS ON LOW-SPEED AIRPLANES
C. P. vanDam NASA Washington Dec. 1984 28 p refs
(Contract NAS1-17797)
(NASA-CR-3853; NAS 1.26:3853) Avail: NTIS HC A03/MF A01 CSCL 01A

Winglet airfoil section characteristics which significantly influence cruise performance and handling qualities of an airplane are discussed. A good winglet design requires an airfoil section with a low cruise drag coefficient, a high maximum lift coefficient, and a gradual and steady movement of the boundary layer transition location with angle of attack. The first design requirement provides a low crossover lift coefficient of airplane drag polars with winglets off and on. The other requirements prevent nonlinear changes in airplane lateral/directional stability and control characteristics. These requirements are considered in the design of a natural laminar flow airfoil section for winglet applications and chord Reynolds number of 1 to 4 million. E.A.K.

N85-12864*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LOCAL STABILITY ANALYSIS FOR A PLANAR SHOCK WAVE
M. D. Salas Dec. 1984 14 p refs
(NASA-TP-2387; L-15768; NAS 1.60:2387) Avail: NTIS HC A02/MF A01 CSCL 01A

A procedure to study the local stability of planar shock waves is presented. The procedure is applied to a Rankine-Hugoniot shock in a divergent/convergent nozzle, to an isentropic shock in a divergent/convergent nozzle, and to Rankine-Hugoniot shocks attached to wedges and cones. It is shown that for each case, the equation governing the shock motion is equivalent to the damped harmonic oscillator equation. E.A.K.

N85-12865*# Princeton Univ., N. J. Gas Dynamics Lab.
STUDY OF THE STRUCTURE OF TURBULENT SHEAR FLOWS AT SUPERSONIC SPEEDS AND HIGH REYNOLDS NUMBER Final Technical Report, 1 Sep. 1981 - 31 Aug. 1984
Alexander J. Smits and Seymour M. Bogdonoff Dec. 1984 64 p refs
(Grant NAGw-240)
(NASA-CR-174144; NAS 1.26:174144) Avail: NTIS HC A04/MF A01 CSCL 01A

A major effort to improve the accuracies of turbulence measurement techniques is described including the development and testing of constant temperature hot-wire anemometers which automatically compensate for frequency responses. Calibration and data acquisition techniques for normal and inclined wires operated in the constant temperature mode, flow geometries, and physical models to explain the observed behavior of flows are discussed, as well as cooperation with computational groups in the calculation of compression corner flows. A.R.H.

N85-12866*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
DEVELOPMENT OF COMPUTATIONAL FLUID DYNAMICS AT NASA AMES RESEARCH CENTER
Mamoru Inouye Oct. 1984 10 p refs
(NASA-TM-86021; A-9887; NAS 1.15:86021) Avail: NTIS HC A02/MF A01 CSCL 01A

Ames Research Center has the lead role among NASA centers to conduct research in computational fluid dynamics. The past, the present, and the future prospects in this field are reviewed. Past accomplishments include pioneering computer simulations of fluid dynamics problems that have made computers valuable in complementing wind tunnels for aerodynamic research. The present facilities include the most powerful computers built in the United States. Three examples of viscous flow simulations are presented: an afterbody with an exhaust plume, a blunt fin mounted on a flat plate, and the Space Shuttle. The future prospects include implementation of the Numerical Aerodynamic Simulation Processing System that will provide the capability for solving the viscous flow field around an aircraft in a matter of minutes. Author

N85-12867*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SPACE SHUTTLE ORBITER TRIMMED CENTER-OF-GRAVITY EXTENSION STUDY. VOLUME 8: EFFECTS OF CONFIGURATION MODIFICATIONS ON THE AERODYNAMIC CHARACTERISTICS OF THE 140 A/B ORBITER AT A MACH NUMBER OF 5.97
W. Pelham Phillips Nov. 1984 73 p refs
(NASA-TM-72661-Vol-8; NAS 1.15:72661-Vol-8) Avail: NTIS HC A04/MF A01 CSCL 01A

Aerodynamic characteristics at $M=5.97$ for the 140 A/B Space Shuttle Orbiter configuration and for the configuration modified by geometric changes in the wing planform fillet region and the fuselage forebody are presented. The modifications, designed to extend the orbiter's longitudinal trim capability to more forward center of gravity locations, include reshaping the baseline wing fillet, changing the fuselage forebody camber, and adding canards. The Langley 20 inch Mach 6 Tunnel at a Reynolds number of approximately 6 million based on fuselage reference length was used. The angle of attack range of the investigation varied from about 15 deg to 35 deg at 0 deg and -5 deg sideslip angles. Data are obtained with the elevators and body flap deflected at appropriate negative and positive conditions to assess the trim limits. E.A.K.

N85-12868*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A COMPARISON OF WORTMANN AIRFOIL COMPUTER-GENERATED LIFT AND DRAG POLARS WITH FLIGHT AND WIND TUNNEL RESULTS
Albion H. Bowers and Alex G. Sim Nov. 1984 16 p refs Prepared in cooperation with NASA. Dryden Flight Research Center
(NASA-TM-86035; H-1231; NAS 1.15:86035) Avail: NTIS HC A02/MF A01 CSCL 01A

Computations of drag polars for a low-speed Wortmann sailplane airfoil are compared with both wind tunnel and flight test results. Excellent correlation was shown to exist between computations and flight results except when separated flow regimes were encountered. Smoothness of the input coordinates to the PROFILE computer program was found to be essential to obtain accurate comparisons of drag polars or transition location to either the flight or wind tunnel flight results. Author

N85-12869*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EFFECT OF A VARIABLE CAMBER AND TWIST WING AT TRANSONIC MACH NUMBERS
James C. Ferris Dec. 1984 56 p refs
(NASA-TM-86281; L-15577; NAS 1.15:86281) Avail: NTIS HC A4/MF A01 CSCL 01A

The effects of changing from a symmetrical wing section to one with camber and twist on the longitudinal aerodynamic characteristics of a 1/15-scale generic fighter model were determined. The wing had a 40 deg leading edge sweep, a taper ratio of 0.29, and aspect ratio of .36, and a maximum thickness ratio of 0.04. The model was a single engine configuration with a single vertical tail and an all movable horizontal tail mounted below the wing reference plane. It is indicated that in incremental increase in lift coefficient of 0.18 to 0.28 is obtained with the camber and twist over the angle of attack range. E.A.K.

N85-12870*# Vanderbilt Univ., Nashville, Tenn. School of Engineering.
THE ROLE OF FREESTREAM TURBULENCE SCALE IN SUBSONIC FLOW SEPARATION Interim Report, 1 Jul. 1984

- 31 Dec. 1984
J. Leith Potter, W. R. Seebaugh, R. Joel Barnett, and Rajiv B. Gokhale 31 Dec. 1984 35 p refs
(Grant NAG1-483)
(NASA-CR-174172; NAS 1.26:174172; IPR-1) Avail: NTIS HC A03/MF A01 CSCL 01A

The ojective of this work is the clarification of the role of freestream turbulence scale in determining the location of boundary layer separation. An airfoil in subsonic wind tunnel flow is the specific case studied. Hot-film and hot-wire anemometry, liquid-film visualization and pressure measurements are the principal diagnostic techniques in use. The Vanderbilt University subsonic wind tunnel is the flow facility being used. B.W.

N85-12871*# North Carolina State Univ., Raleigh. Dept. of Mechanical and Aerospace Engineering.
PHYSICS ON AIRCRAFT WAKES Progress Report, 15 May - 14 Nov. 1984
H. A. Hassan [1984] 14 p refs
(Contract NCC1-84)
(NASA-CR-174105; NAS 1.26:174105; PR-1) Avail: NTIS HC A02/MF A01 CSCL 01A

The roll-up of a vortex sheet is analyzed by two approaches. The first is based on exact compressible Euler equations while the second is based on the exact incompressible Navier-Stokes equations. The inviscid calculations for the two-dimensional problem do not indicate any roll-up of the sheet. On the other hand, the viscous calculations capture the dynamics of the roll-up rather well. This suggests that the generally held views regarding the roll-up process of aircraft wakes, namely, that it be treated as an inviscid process, may not be completely accurate. Author

N85-12872# Institut Franco-Allemand de Recherches, St. Louis (France).
LASER ANEMOMETER STUDY OF SEPARATED FLOW ON WING PROFILES [ETUDE PAR ANEMOMETRIE LASER D'ECOULEMENTS DECOLLES SUR DES PROFILS D'AILE]
B. C. Jaeggy and P. Meyer 17 May 1983 79 p refs In FRENCH
Presented at DFVLR Zentrums Conf., Brunswick, 5 May 1983
(Contract DRET-82/318)
(ISL-CO-214/83) Avail: NTIS HC A05/MF A01

Subsonic wind tunnel tests were carried out using a 2 dimensional laser velocimeter on the NACA 65213 and RA 16 SC1 profiles. The results show the average velocity components and the turbulent parameters in the separated flow. The influence of a spoiler on an RA 16 SC1 profile was also examined. The efficiency of the numerical methods to describe the results is discussed. Author (ESA)

N85-12873# Office National d'Etudes et de Recherches Aerospatiales, Paris (France). Direction de l'Aerodynamique.
WALL ADAPTATION AT MACH 1.2 [ADAPTATION DE PAROIS A MACH 1.2]
Y. LeSant Feb. 1984 41 p refs In FRENCH
(ONERA-RTS-26/3075-AY-402) Avail: NTIS HC A03/MF A01

To minimize the wall effect in low supersonic wind tunnel tests, in the presence of strong three dimensional shock waves, a self adaptable wall system is proposed. A method to analyze the wall effects in two dimensional flow which also gives a minimum effect wall shape is described. The method is extendable to three dimensional flow. Author (ESA)

N85-12874# Eidgenoessisches Flugzeugwerk, Emmen (Switzerland). Versuchs- und Forschungsanlage.
SINGULARITY MODEL FOR THE ANALYSIS OF WALL INTERFERENCE IN CLOSED WIND TUNNELS ACCORDING TO THE WALL PRESSURE SIGNATURE METHOD (BLOCKAGE AND LIFT) [SINGULARITAETEN-MODELL ZUR ANALYSE DER WANDINTERFERENZ IN GESCHLOSSENEN WINDKANALEN NACH DER WANDDRICKSIGNATUR-METHODE (BLOCKIERUNG UND AUFTRIEB)]
Bruno Mueller 2 Sep. 1982 91 p refs In GERMAN
(FW-FO-1612) Avail: NTIS HC A05/MF A01

Correction methods for wall influence in large wind tunnels are considered. Tunnel blockage up to any desired angle of attack was determined by mathematically modeled wall pressure signatures. A qualitative definition of blockage and lift correction is obtained by a swell/drop and vortex modeling for typical aircraft models. Author (ESA)

N85-12875# Eidgenoessisches Flugzeugwerk, Emmen (Switzerland). Versuchs- und Forschungsanlage.
WALL INFLUENCE CORRECTIONS IN WIND TUNNELS: BLOCKAGE CORRECTION ACCORDING TO THE WALL PRESSURE SIGNATURE METHOD [WANDEINFLUSSKORREKTUREN IN WINDKANAELEN: BLOCKIERUNGSKORREKTUR NACH DER WANDRUCKSIGNATUR-METHODE]
Bruno Mueller 14 Sep. 1983 60 p refs In GERMAN
(FW-FO-1613) Avail: NTIS HC A04/MF A01

Blockage correction methods for large models or high angles of attack in closed wind tunnels are discussed. The wall pressure signature method based on a FORTRAN program was used. A correction calculation without computing of problem parameters is outlined. Author (ESA)

N85-12876# Eidgenoessisches Flugzeugwerk, Emmen (Switzerland). Versuchs- und Forschungsanlage.
PARAMETRIC DETERMINATION OF BLOCKAGE INTERFERENCE OF 3-DIMENSIONAL MODELS IN THE EMMEN FEDERAL AIRCRAFT WORKS TRANSONIC TUNNEL (SWITZERLAND) [PARAMETRISCHE BESTIMMUNG DER BLOCKIERUNGSINTERFERENZEN FUER DREI-DIMENSIONALE MODELLE IM TRANSONIC-KANAL DES EIDGENOESSISCHES FLUGZWERK, EMMEN]
Gerard Capitaine 9 Dec. 1982 36 p refs In GERMAN
(FW-FO-1636) Avail: NTIS HC A03/MF A01

Blockage correction for three dimensional, compressible flow in a rectangular measuring section is treated. Upper and lower walls were slotted, side walls were closed. Results show that the weakest blockage appears when slot and porosity parameters are situated near to 1. Author (ESA)

N85-12877# Eidgenoessisches Flugzeugwerk, Emmen (Switzerland). Versuchs- und Forschungsanlage.
INVESTIGATIONS OF BOUNDARY LAYERS IN THE EMMEN FEDERAL AIRCRAFT WORKS TRANSONIC TUNNEL, SWITZERLAND [GRENZSCHICHTUNTERSUCHUNGEN IM TRANSONIC-KANAL DES EIDGENOESSISCHES FLUGZWERKE, EMMEN]
Niculae Cantuniar 11 Mar. 1983 136 p refs In GERMAN
(FW-FO-1641) Avail: NTIS HC A07/MF A01

Boundary layer generation along transonic wind tunnel walls was investigated. Initial and boundary conditions were determined by a computer program. Results make it possible to determine the porosity factors of slotted tunnel walls. Author (ESA)

N85-12878# Eidgenoessisches Flugzeugwerk, Emmen (Switzerland). Versuchs- und Forschungsanlage.
COMPARATIVE FLOW CALCULATION ON TRANSONIC CONE/CYLINDER STANDARD MODELS IN CONNECTION WITH THE WALL INTERFERENCE PROBLEM [VERGLEICHENDE STROEMUNGSRECHNUNG AN TRANSSONISCHEN KEGEL/ZYLINDER-EIDHMODELLEN IM ZUSAMMENHANG MIT DEM WANDINTERFERENZPROBLEM]
Marc Boffo and Raffaello Pozzorini 5 Dec. 1983 133 p refs In GERMAN
(FW-FO-1689) Avail: NTIS HC A07/MF A01

A computer program (RAXBOD) was used for the calculation of frictionless flow over slim bodies with sharp pointed and discontinuous profiles. For cone half-angles of 7.5 to 13.75 deg arc good accordance with measured results is obtained, while for half-angles of 20 deg arc and 30 deg only partly satisfying results are found. The reasons for this are not clear. Author (ESA)

N85-12879# Aeronautical Research Inst. of Sweden, Stockholm. Aerodynamics Dept.
A LOCAL SLOT BOUNDARY CONDITION FOR TRANSONIC

FLOW CALCULATIONS IN SLOTTED-WALL TEST SECTIONS OF WIND TUNNELS
Nada Agrell, Yngve C.-J. Sedin (SAAB-SCANIA AB, Linkoeping, Sweden), and Naiping Zhang (Northwestern Polytechnical Univ., Xian, China) Sep. 1984 30 p refs
(Contract FMV-FlygFl-82260-83-053-25-001)
(FFA-TN-1984-34) Avail: NTIS HC A03/MF A01

A local slot boundary condition is outlined and numerical results where the wall interference is calculated using a small perturbation equation in a rectangular test section with 16 equal slots are shown. The slots are locally substituted by wall strips located symetrically around each slot when calculating the test section flows. The flow through the slots are treated separately giving Dirichlet conditions along the strips in terms of the slot fluxes. Between the strips on the wall, Neumann conditions are applied. The test section flow is interactively solved with an inviscid slot flow model. Results for a delta wing at different Mach numbers and angles of attack are given. The numerical procedure is convergent, and encouraging results are obtained in terms of wall pressures and model pressures as well as integrated forces. Author (ESA)

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N85-12880# Factory Mutual Research Corp., Norwood, Mass.
MODELING OF AIRCRAFT CABIN FIRES
M. A. Delichatsios Sep. 1984 117 p refs Sponsored in part by FAA
(NBS-GCR-84-473) Avail: NTIS HC A06/MF A01

In this work, simple fire dynamic models for various components of an aircraft cabin fire are developed. These simple integral models can be incorporated in global zone models for aircraft cabin fires occurring in flight or caused by an impact-survivable crash. The major accomplishment of this work was the development of simple expressions for the burning of vertical walls, simulating, for example, the burning of wall panels in the fuselage. Flame heights of vertical wall fires are predicted and correlated by a simple expression. In addition, critical conditions for extinction of rapid flame spread have been investigated for fires in vertical walls consisting of charring materials, allowing for the prediction of flame spread rates. These critical conditions were developed based on simple vertical wall burning and flame height correlations, as well as on a simple model for charring pyrolysis. Preliminary analysis of integral models for ceiling flows (such as that along the aircraft cabin ceiling) including combustion indicates that an equation for the decay of turbulence is required for describing such flows. One of the outcomes of this work is the identification of material properties controlling flammability. B.W.

N85-12881# Washington Univ., Seattle. Dept. of Psychology.
POST FIRE INTERVIEW: DEVELOPMENT AND FIELD VALIDATION OF THE BEHAVIORAL SEQUENCE INTERVIEW TECHNIQUE Final Report
John P. Keating and Elizabeth F. Loftus Oct. 1984 92 p refs
(Contract NB-80-NADA-1053)
(NBS-GCR-84-477) Avail: NTIS HC A05/MF A01

The development and field-validation of a research interview instrument which is used for recording how people behave/act after the outbreak of a residential fire is discussed. In the first phase of the interview, the witness is invited to recount his story of the fire, free from interference or questions. During the second phase, the witness and interviewer cooperatively generate a comprehensive account of the witness' actions, the reasons for each action, and the situational cue during the fire using a standardized format. During its development, the behavioral sequence technique was used successfully to interview 357 respondents in Seattle and New York City. Responses were coded, quantified and analyzed using a modification of the Breaux technique for developing a graphical representation of response sequences. Statistics regarding the sample of fires and of interviewees are presented. R.J.F.

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

N85-12882# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
ANALYSIS AND SIMULATION OF AN INTERTIAL SYSTEM (STRAPDOWN) FOR AUXILIARY ATTITUDE DETERMINATION BY ADAPTIVE DRIFT ESTIMATION M.S. Thesis [ANALISE E SIMULACAO DE UM SISTEMA INERCIAL (STRAPDOWN) DE DETERMINACAO DE ATITUDE AUXILIADO POR ESTIMACAO ADAPTATIVA DA DERIVA]
Nei Cardoso Cardenuto Aug. 1984 127 p refs In PORTUGUESE; ENGLISH summary
(INPE-3257-TDL/177) Avail: NTIS HC A07/MF A01

The attitude determination of space vehicles equiped with aided inertial systems, such as strapdown, consists basically of: (1) propagation of attitude utilizing measures of inertial sensors, (2) periodical reinitialization of the attitude and parameters of calibration of the inertial sensors, through the use of non-inertial sensors and respective attitude determination procedures. Starting from the analysis and simulation of systems like this for satellite use, a procedure for attitude estimation of the calibration parameters (measurement errors in gyros) is implemented and tested. A stochastic model for attitude propagation is adopted and the extended Kalman filter is used with an adaptive procedure for estimation of the noise in the state, in a scheme of direct filtering whose frequency is slightly less than that of propagation. The results obtained by digital simulation constitute a preliminary qualification of the procedure for the case of attitude determination of artificial satellites. Author

N85-12883# Committee on Science and Technology (U. S. House).
AIRCRAFT NAVIGATION AND LANDING TECHNOLOGY: STATUS OF IMPLEMENTATION
Washington GPO 1984 202 p Hearing before the Subcomm. on Transportation, Aviation and Mater. of the Comm. on Sci. and Technol., 98th Congr., 2nd Sess., No. 109, 24 Jul. 1984
(GPO-38-615) Avail: Subcommittee on Transportation, Aviation and Materials

The background and current status of the Microwave Landing System (MLS); market environment; operational considerations; and the Non-Federal Systems and Airway's Improvement Program were discussed. B.G.

N85-13115# Joint Publications Research Service, Arlington, Va.
ACCOUNTING FOR ERROR STOCHASTICITY IN TERMINAL HOMING OF AIRCRAFT Abstract Only
P. I. Kuznetsov, L. A. Pcelintsev, and Ye. S. Sabynin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 75 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Tekhn. Kibernetika (Moscow), no. 1, Jan. - Feb. 1984 p 213-216
(For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

N85-12884*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
FLIGHT AND WIND-TUNNEL COMPARISONS OF THE INLET-AIRFRAME INTERACTION OF THE F-15 AIRPLANE
Lannie D. Webb, Dom Andriyich-Varda, and Stephan A. Whitmore Nov. 1984 35 p refs
(NASA-TP-2374; H-1175; NAS 1.60:2374) Avail: NTIS HC A03/MF A01 CSCL 01C

The design of inlets and nozzles and their interactions with the airplane which may account for a large percentage of the total drag of modern high performance aircraft is discussed. The inlet/airframe interactions program and the flight tests conducted is described. Inlet drag and lift data from a 7.5% wind-tunnel model are compared with data from an F-15 airplane with instrumentation to match the model. Pressure coefficient variations with variable cowl angles, capture ratios, examples of flow interactions and angles of attack are for Mach numbers of 0.6, 0.9, 1.2, and 1.5 are presented. E.A.K.

N85-12885*# Ohio Univ., Athens. Avionics Engineering Center.
REALISTIC LOCALIZER COURSES FOR AIRCRAFT INSTRUMENT LANDING SIMULATORS Final Report
Timothy A. Murphy Hampton, Va. NASA. Langley Research Center May 1984 78 p refs
(Contract NAS1-17368)
(NASA-CR-172333; NAS 1.26:172333; OU/AEC/EER-66-1) Avail: NTIS HC A05/MF A01 CSCL 01C

The realistic instrument landing simulator (ILS) course structures for use in aircraft simulators are described. Software developed for data conversion and translation of ILS course structure measurements and calcomp plots of the courses provided are described. A method of implementing the ILS course structure data in existing aircraft simulators is outlined. A cockpit used in the lab to review the digitized ILS course structures is displayed. E.A.K.

N85-12886# Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
MODERN STRUCTURAL MATERIALS. PRESENT SITUATION AND EVOLUTION PROSPECTS [LES MATERIAUX STRUCTURAUX MODERNES SITUATION ACTUELLES ET PERSPECTIVES D'EVOLUTION]
G. Hilaire 14 Aug. 1984 60 p In FRENCH Presented at Semaine Aeron. G.I.F.A.S., Madrid, 12-15 Jun. 1984
(SNIAS-842-551-101) Avail: NTIS HC A04/MF A01

The properties of light alloys, composites, steels and titanium alloys used in aircraft construction are reviewed. The mechanical properties, including tensile strength, modulus and fatigue resistance, and the economic factors are compared. It is shown that the finished products of carbon reinforced plastic materials have costs of the same order as those manufactured with light alloys. The prospects of aluminum, lithium alloys, powder metallurgy and metallic matrix composites are discussed. The applications of new materials in aircraft, helicopters and engines are examined. Author (ESA)

N85-12887*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
INITIAL FEASIBILITY GROUND TEST OF A PROPOSED PHOTOGRAMMETRIC SYSTEM FOR MEASURING THE SHAPES OF ICE ACCRETIONS ON HELICOPTER ROTOR BLADES DURING FORWARD FLIGHT Final Report, 1 Oct. - 31 Dec. 1983
R. L. Palko (Calspan Field Services, Inc., Arnold Air Force Station, Tenn.), P. L. Cassady (Calspan Field Services, Inc., Arnold Air Force Station, Tenn.), R. C. McKnight, and R. J. Freedman Aug. 1984 45 p
(NASA-TM-87391; NAS 1.15:87391; AD-A146051; AEDC-TR-84-10) Avail: NTIS HC A03/MF A01 CSCL 01C

A ground test was accomplished to determine if a combination of standard photographic system parameters could be chosen that would allow stereophotographs to be made of the main rotor of a UH-1H helicopter in forward flight. The photographs would be used to measure the shape of ice accretions on the rotor in forward flight. During the ground test, 83 photographic pairs were obtained at three camera shutter speeds for a range of ambient light conditions from dark to complete daylight. Twenty-seven of these photographic pairs were evaluated on the AEDC analytical stereocompiler for readability. The test showed that quality photographs could be taken using standard equipment with shutter speeds of 1/30 and 1/60 sec for up to three hours per day. The test also showed that the addition of a specifically designed control circuit for synchronization at 1/500-sec shutter speed would allow testing for the complete day for most winter days. GRA

N85-12888# Eidgenoessisches Flugzeugwerk, Emmen (Switzerland). Versuchs- und Forschungsanlage.
GRAPHICS SOFTWARE FOR THE DISPLAY OF BODY DEFORMATION MOTION [GRAPHISCHE SOFTWARE ZUR DARSTELLUNG DER DEFORMATIONSBEWEGUNG EINES KOERPERS]
Georges Mandanis 6 Jan. 1983 76 p In GERMAN
(FW-FO-1640) Avail: NTIS HC A05/MF A01

Three programs for graphic display of the characteristic mode of aircraft structures were elaborated. They are interactive and affect geometrical data; deformation structure; and alternative nodal line display, respectively. The system can also be used for the display of objects other than aircraft. Author (ESA)

N85-13460# Joint Publications Research Service, Arlington, Va.
EFFECTIVENESS OF AGRICULTURAL AVIATION
V. V. Kuzkin *In its* USSR Rept.: Life Sci.: Biomed. and Behavioral Sci. (JPRS-UBB-84-026) 5 Dec. 1984 p 21-26 Transl. into ENGLISH from Zashchita Rast. (Moscow), no. 8, Aug. 1984 p 2-4
(For primary document see N85-13457 04-51)
Avail: NTIS HC A08

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

N85-12889*# McDonnell-Douglas Corp., Long Beach, Calif.
SYSTEM STATUS DISPLAY INFORMATION
Leland G. Summers and Jeffrey B. Erickson 17 Oct. 1984 73 p refs
(Contract NAS1-16202)
(NASA-CR-172347; NAS 1.26:172347; MDC-J2616) Avail: NTIS HC A04/MF A01 CSCL 01D

The system Status Display is an electronic display system which provides the flight crew with enhanced capabilities for monitoring and managing aircraft systems. Guidelines for the design of the electronic system displays were established. The technical approach involved the application of a system engineering approach to the design of candidate displays and the evaluation of alternative concepts by part-task simulation. The system engineering and selection of candidate displays are covered. B.G.

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N85-12890*# Dayton Univ., Ohio.
TURBINE BLADE DAMPING STUDY Final Report
Robert J. Dominic Nov. 1984 200 p refs
(Contract NAS8-34682)
(NASA-CR-171255; NAS 1.26:171255; UDR-TR-84-87) Avail: NTIS HC A09/MF A01 CSCL 21E

Research results and progress on the performance of bladed systems is reported the different topics discussed include: the study of turbine blade damping; forced vibrations of friction damped beam moistures in two dimensions; and a users manual for a computer program for dynamic analysis of bladed systems. For individual titles, see N85-12891 through N85-12893.

N85-12891*# Dayton Univ., Ohio.
TURBINE BLADE DAMPING STUDY, INTRODUCTION
In its Turbine Blade Damping Study Nov. 1984 79 p refs (For primary document see N85-12890 04-07)
Avail: NTIS HC A09/MF A01 CSCL 21E

Turbine Blade damping studies are reported. The analytical and experimenal definition of the performance parameters of turbine blade platform friction dampers were studied. The UDRI VAX 11/780 digital computer system experimental studies and a high speed spin pit utilized under a subcontracted effort wee analyzed.. The first turbine stage of the high pressure fuel turbopump (HPFTP) of the space shuttle main engine (SSME), which has exprienced blade fatigue problems are examined. EAK

N85-12892*# Dayton Univ., Ohio.
FORCED VIBRATIONS OF FRICTION-DAMPED BEAM STRUCTURES IN TWO DIMENSIONS
R. A. Brockman *In its* Turbine Blade Damping Study Nov. 1984 22 p (For primary document see N85-12890 04-07)
(UDR-TM-82-08) Avail: NTIS HC A09/MF A01 CSCL 21E

A development effort with the purpose is to define promising solution techniques for vibration problems which involve friction damping in slender, flexible members is described. Root and platform damping in rotating engine blades were analyzed. A computer program which implements several typs of solutions which pertain to the evaluation of steady state response in simple structures which can be represented adequately with beam type finite element is outlined. The correlation of analytical and experimental data, which suggest those extensions and improvements which are necessary before the analytical predictions can be accepted with confidence is also examined. E.A.K.

N85-12893*# Dayton Univ., Ohio.
USERS MANUAL FOR A COMPUTER PROGRAM FOR DYNAMIC RESPONSE ANALYSIS OF BLADED SYSTEMS
M. L. Soni and T. W. Held *In its* Turbine Blade Damping Study Nov. 1984 34 p refs (For primary document see N85-12890 04-07)
(UDR-TR-84-38) Avail: NTIS HC A09/MF A01 CSCL 21E

A Users Manual for a computer program for lumped parameter modeling of the dynamic response of solid friction coupled bladed disk systems is presented. A two parameter lumped mass model for frequency response analysis of multiple ade systems with blade to blade and blade to disk coupling was derived. The model assumes that the blade section between the root and the platform and the section above the platform have the same hysteretic damping factors. It is argued how separate loss factors should be used for the two sections of the blade. The equations and the computer program which allow the specification of different damping factors for the blade sections are presented. E.A.K.

N85-12894*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
AN EXPERIMENTAL INVESTIGATION OF TWO-DIMENSIONAL THRUST AUGMENTING EJECTORS, PART 1 Final Report
L. Bernal and V. Sarohia 15 Aug. 1984 104 p refs Sponsored by NASA, AFFDL, AFOSR, and NADC 2 Vol.
(NASA-CR-174111; JPL-Pub-84-50-Pt-1; NAS 1.26:174111) Avail: NTIS HC A06/MF A01 CSCL 21E

Experiments have been performed with subsonic and underexpanded choked two-dimensional primary nozzle ejector flow systems without diffusion to evaluate the role of entrainment and mixing in thrust augmentation. Two-component Laser Doppler velocity measurements (mean and fluctuating values), thrust measurements, ejector shroud surface pressure measurements and flow visualization were used to determine the evolution of the velocity profiles and their relationship to the ejector performance. The key findings of this research are: (1) Primary jet growth is significantly altered by the ejecter shroud, (2) primary jet turbulent characteristics when normalized with the local mean centerline velocity are in agreement with those for the free-jet, (3) in the neighborhood of the ejector shroud the flow field can be classified into two regions, the potential flow region and the region close to the ejector exist which is dominated by the turbulent transport, and (4) The pressure recovery is very sharp in the first region and is more gradual in the region close to the ejector exit. Author

N85-12895*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
AN EXPERIMENTAL INVESTIGATION OF TWO-DIMENSIONAL THRUST AUGMENTING EJECTORS, PART 2 Final Report, Jan. 1982 - Dec. 1983
L. Bernal and V. Sarohia 15 Aug. 1984 96 p refs Sponsored in part by AFFDL, AFOSR, and NADC 2 Vol.
(Contract NAS7-918)
(NASA-CR-174110; JPL-Pub-84-50-Pt-2; NAS 1.26:174110) Avail: NTIS HC A05/MF A01 CSCL 21E

The flow-field within a two-dimensional thrust augmenting ejector has been documented experimentally. Results are presented on the mean velocity field and the turbulent correlations by Laser Doppler Velocimeter, surface pressure distribution, surface temperature distribution, and thrust performance for two shroud geometries. The maximum primary nozzle pressure ratio tested was 3.0. The tests were conducted at primary nozzle temperature ratios of 1.0, 1.8 and 2.7. Two ejector characteristic lengths have been identified based on the dynamics of the ejector flow field, i.e., a minimum length L sub m below which no significant mixing occurs, and a critical length L sub c associated with the development of U'V' correlation in the ejector. These characteristic lengths divide the ejector flow field into three distinctive regions: the entrance region where there is no direct interaction between the primary flow and the ejector shroud; the interaction region where there is an increased momentum of induced flow near the shroud surface; and a pipe flow region characterized by an increased skin friction where x is the distance downstream from the ejector inlet. The effect of the coflowing induced flow has been shown to produce inside the ejector a centerline velocity that has increased over the free-jet data. B.W.

N85-12896# Rolls-Royce Ltd., Derby (England).
TURBOMACHINERY BLADE DESIGN USING ADVANCED CALCULATION METHODS
P. Stow 1 Sep. 1984 44 p refs Presented at NATO Adv. Study Inst. on Thermodyn. and Fluid Mech. of Turbomachinery, Sep. 1984 Submitted for publication
(PNR-90218) Avail: NTIS HC A03/MF A01

Computer aided turbomachinery blade design is discussed. Through-flow calculation, blade section design using computerized design and analysis methods, and blade section stacking are outlined. Ways in which three-dimensional effects can be

included in the system are presented. The need for fully three-dimensional methods is discussed. Flow modeling is considered.
Author (ESA)

N85-12897# Rolls-Royce Ltd., Derby (England).
INCORPORATION OF VISCOUS-INVISCID INTERACTIONS IN TURBOMACHINERY DESIGN
P. Stow 1 Sep. 1984 40 p refs Presented at NATO Adv. Study Inst. on Thermodyn. and Fluid Mech. of Turbomachinery, Sep. 1984 Submitted for publication
(PNR-90219) Avail: NTIS HC A03/MF A01

The incorporation of viscous-inviscid interactions in turbomachinery blade design for loss and heat transfer prediction is discussed. The approach which couples a boundary layer method to an inviscid blade-to-blade program is recalled. Ways of representing the effects of the boundary layer on the inviscid flow, including displacement and transpiration models are covered. Ways of coupling the inviscid and viscous calculations are discussed. The development of fully viscous methods which solve the Reynolds average Navier-Stokes equations are outlined. Pressure-correction and implicit time marching methods are described.
Author (ESA)

N85-12898# Rolls-Royce Ltd., Derby (England).
MODELLING VISCOUS FLOW IN TURBOMACHINERY
P. Stow 1 Sep. 1984 38 p refs Presented at NATO Adv. Study Inst. on Thermodyn. and Fluid Mech. of Turbomachinery, Sep. 1984 Submitted for publication
(PNR-90220) Avail: NTIS HC A04/MF A01

Mathematical modeling of viscous phenomena in turbomachine blade through-flow analysis, including a blade loss model, end-wall boundary layer analysis, and secondary flow and spanwise mixing effects are discussed. Surface boundary layer inclusion in the blade-to-blade analysis is considered, together with details of the inviscid-viscous coupling using a surface transpiration model. Boundary layer laminar, transitional and turbulent flow are covered in an integral analysis. Author (ESA)

N85-12899# Elektroschmelzwerk Kenpten G.m.b.H., Munich (West Germany).
DEVELOPMENT AND FABRICATION OF REFRACTORY BODIES FOR GAS TURBINE ENGINES Final Report, Apr. 1983
Klaus Hunold, Wolfgang Grellner, Alfred Lipp, and Klaus Reinmuth Bonn Bundesministerium fuer Forschung und Technologie Sep. 1984 75 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-84-180; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 16

Applying hot isostatic pressing (HIP) techniques, dense bodies were manufactured from SiC and SiC/Si3 N4 mixtures with and without sintering aids. The correlation between strength and microstructure of hot-pressed silicon carbide (HPSIC) with different aluminum additions was investigated. The material properties of HIPSIC and standard-SiC were compared. The conditions of diffusion bonding of SiC parts were elaborated. Author (ESA)

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N85-12900*# Information and Control Systems, Inc., Hampton, Va.
FLIGHT TESTS OF THE DIGITAL INTEGRATED AUTOMATIC LANDING SYSTEM (DIALS) Final Report
Nesim Halyo Washington NASA Dec. 1984 127 p refs
(Contract NAS1-16158)
(NASA-CR-3859; NAS 1.26:3859; TR-683106) Avail: NTIS HC A07/MF A01 CSCL 01C

The design, development, implementation and flight tests of the Digital Integrated Automatic Landing System (DIALS) are discussed. The system was implemented and flight tested on the Transport Systems Research Vehicle (TSRV), a Boeing 737-100. The design uses modern optimal control methods. The direct digital design obtained uses a 10 Hz rate for the sampling of sensors and the control commands. The basic structure of the control law consists of a steady state Kalman filter followed by a control gain matrix. The sensor information used includes Microwave Landing System (MLS) position, attitude, calibrated airspeed, and body accelerations. The phases of the final approach considered are localized and steep glideslope capture (which may be performed simultaneously or independently), localizer and glideslope track, crab/decrab, and flare to touchdown. The system can capture, track, and flare from conventional, as well as steep, glideslopes ranging from 2.5 deg to 5.5 deg. All of the modes of the control law including the Kalman filters were implemented on the TSRV flight computers which use fixed point arithmetic with 16 bit words. The implementation considerations are described as well as an analysis of the flight test results. R.J.F.

N85-12901*# United Technologies Research Center, East Hartford, Conn.
HIGH-TEMPERATURE OPTICALLY ACTIVATED GaAs POWER SWITCHING FOR AIRCRAFT DIGITAL ELECTRONIC CONTROL
J. M. Berak, D. H. Grantham, J. L. Swindal, J. F. Black, and L. B. Allen May 1983 201 p refs
(Contract NAS3-22535)
(NASA-CR-174711; NAS 1.26:174711; UTRC-R83-925312-25) Avail: NTIS HC A10/MF A01 CSCL 01C

Gallium arsenide high-temperature devices were fabricated and assembled into an optically activated pulse-width-modulated power control for a torque motor typical of the kinds used in jet engine actuators. A bipolar heterojunction phototransistor with gallium aluminum arsenide emitter/window, a gallium arsenide junction field-effect power transistor and a gallium arsenide transient protection diode were designed and fabricated. A high-temperature fiber optic/phototransistor coupling scheme was implemented. The devices assembled into the demonstrator were successfully tested at 250 C, proving the feasibility of actuator-located switching of control power using optical signals transmitted by fibers. Assessments of the efficiency and technical merits were made for extension of this high-temperature technology to local conversion of optical power to electrical power and its control at levels useful for driving actuators. Optical power sources included in the comparisons were an infrared light-emitting diode, an injection laser diode, tungsten-halogen lamps and arc lamps. Optical-to-electrical power conversion was limited to photovoltaics located at the actuator. Impedance matching of the photovoltaic array to the load was considered over the full temperature range, -55 C to 260 C. Loss of photovoltaic efficiency at higher temperatures was taken into account. Serious losses in efficiency are: (1) in the optical source and the cooling which they may require in the assumed 125 C ambient, (2) in the decreased conversion efficiency of the gallium arsenide photovoltaic at 260 C, and (3) in impedance matching. Practical systems require improvements in these areas.
Author

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N85-12902# Federal Aviation Administration, Atlantic City, N.J.
CLOSELY SPACED INDEPENDENT PARALLEL RUNWAY SIMULATION Final Report

Dorothy L. Buckanin, Rodney C. Guishard, and Lee E. Paul Oct. 1984 72 p refs
(DOT/FAA/CT-84/45) Avail: NTIS HC A04/MF A01

Closely spaced independent parallel runway operations under instrument meteorological conditions were simulated to determine: (1) the impact of reduced runway spacings on the air traffic controller's ability to detect and resolve potential conflicts; and (2) the surveillance sensor accuracy and update rates needed to support closer runway separation. The environment was configured to simulate a terminal radar control room conducting independent parallel runway operations. Sixteen full performance level field controllers participated in the simulation; final and local control positions were manned by Technical Center controllers. Six experimental conditions were simulated involving 48 1 hour data gathering experimental runs conducted over a 4 week period. It is indicated that safe operations can be conducted at 3,400 feet runway separation provided a surveillance radar of at least a 2 second update rate and 2 milliradian accuracy is used. It is anticipated that some increase in penetrations of the no transgression zone may result from this reduction. E.A.K.

N85-12903*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.
THE PRELIMINARY CHECKOUT, EVALUATION AND CALIBRATION OF A 3-COMPONENT FORCE MEASUREMENT SYSTEM FOR CALIBRATING PROPULSION SIMULATORS FOR WIND TUNNEL MODELS Final Report
William A. Scott Sep. 1984 180 p refs
(Contract NCC2-100)
(NASA-CR-174113; NAS 1.26:174113; KU-FRL-510-1) Avail: NTIS HC A09/MF A01 CSCL 14B

The propulsion simulator calibration laboratory (PSCL) in which calibrations can be performed to determine the gross thrust and airflow of propulsion simulators installed in wind tunnel models is described. The preliminary checkout, evaluation and calibration of the PSCL's 3 component force measurement system is reported. Methods and equipment were developed for the alignment and calibration of the force measurement system. The initial alignment of the system demonstrated the need for more efficient means of aligning system's components. The use of precision alignment jigs increases both the speed and accuracy with which the system is aligned. The calibration of the force measurement system shows that the methods and equipment for this procedure can be successful. E.A.K.

N85-12904# Eidgenoessisches Flugzeugwerk, Emmen (Switzerland). Versuchs- und Forschunsanlage.
INVESTIGATION FOR THE IMPROVEMENT OF THE TRANSONIC TUNNEL WORKING SECTION OF THE EMMEN FEDERAL AIRCRAFT WORKS (SWITZERLAND) [UNTERSUCHUNG ZUR VERBESSERUNG DER TRANSONIC-KANAL-MESSSTRECKE DES EIDGENOESSISCHES FLUGZWERKE, EMMEN]
Gerard Capitaine 20 Oct. 1983 75 p refs In GERMAN
(FW-FO-1681) Avail: NTIS HC A04/MF A01

Wall interference correction in transonic wind tunnels for three dimensional models is treated. Slotted measuring section configurations and their effects on the flow conditions in empty tunnels and on models were investigated. Main characteristics for Mach numbers 0.65 $< M <$ 1.0 are : axial pressure gradient $<$ 0.002; drag coefficient $<$ 0.0002; standard deviation of Mach number distribution $<$ 0.002 and angle of attack = - 2 deg. Author (ESA)

N85-13461# Joint Publications Research Service, Arlington, Va.
OPERATION OF AVIATION SUPPORT BASES
E. Kh. Gasanov *In its* USSR Rept.: Life Sci.: Biomed. and Behavioral Sci. (JPRS-UBB-84-026) 5 Dec. 1984 p 27-28 Transl. into ENGLISH from Zashchita Rast. (Moscow), no. 8, Aug. 1984 p 4 (For primary document see N85-13457 04-51)
Avail: NTIS HC A08

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N85-12905*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MISSION SCIENCE VALUE-COST SAVINGS FROM THE ADVANCED IMAGING COMMUNICATION SYSTEM (AICS)
Robert F. Rice 15 Jul. 1984 38 p refs
(Contract NAS7-918)
(NASA-CR-174170; JPL-Pub-84-33; NAS 1.26:174170) Avail: NTIS HC A03/MF A01 CSCL 22A

An Advanced Imaging Communication System (AICS) was proposed in the mid-1970s as an alternative to the Voyager data/communication system architecture. The AICS achieved virtually error free communication with little loss in the downlink data rate by concatenating a powerful Reed-Solomon block code with the Voyager convolutionally coded, Viterbi decoded downlink channel. The clean channel allowed AICS sophisticated adaptive data compression techniques. Both Voyager and the Galileo mission have implemented AICS components, and the concatenated channel itself is heading for international standardization. An analysis that assigns a dollar value/cost savings to AICS mission performance gains is presented. A conservative value or savings of $3 million for Voyager, $4.5 million for Galileo, and as much as $7 to 9.5 million per mission for future projects such as the proposed Mariner Mar 2 series is shown. E.A.K.

N85-12906*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
TECHNOLOGIES FOR SPACE STATION AUTONOMY
Robert L. Staehle 15 Jun. 1984 80 p refs
(Contract NAS7-918)
(NASA-CR-174112; JPL-Pub-84-45; NAS 1.26:174112) Avail: NTIS HC A05/MF A01 CSCL 22A

This report presents an informal survey of experts in the field of spacecraft automation, with recommendations for which technologies should be given the greatest development attention for implementation on the initial 1990's NASA Space Station. The recommendations implemented an autonomy philosophy that was developed by the Concept Development Group's Autonomy Working Group during 1983. They were based on assessments of the technologies' likely maturity by 1987, and of their impact on recurring costs, non-recurring costs, and productivity. The three technology areas recommended for programmatic emphasis were: (1) artificial intelligence expert (knowledge based) systems and processors; (2) fault tolerant computing; and (3) high order (procedure oriented) computer languages. This report also describes other elements required for Station autonomy, including technologies for later implementation, system evolvability, and management attitudes and goals. The cost impact of various technologies is treated qualitatively, and some cases in which both the recurring and nonrecurring costs might be reduced while the crew productivity is increased, are also considered. Strong programmatic emphasis on life cycle cost and productivity is recommended. Author

N85-12907# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany).
COLLOQUIUM ABOUT JOINT PROJECTS WITHIN DFVLR/ISRO COOPERATION
Jun. 1984 102 p refs Colloq. held at Bangalore, 24 Jan. 1984
(DFVLR-Mitt-84-12) Avail: NTIS HC A06/MF A01

The Multispectral Electro-optical Stereo Scanner Mission; the Stretched Rohini Satellite System; the Augmented Satellite Launch Vehicle program; the Autonomous Payload Control experiment; a satellite-borne 90 GHz radiometer; and telecommunication research were discussed. For individual titles, see N85-12908 through N85-12914.

N85-12908# Indian Space Research Organization, Bangalore.
AN OVERVIEW OF MULTISPECTRAL ELECTRO-OPTICAL

STEREO SCANNER (MEOSS) MISSION

U. R. Rao *In* DFVLR Colloq. about Joint Projects within DFVLR/ISRO Cooperation Jun. 1984 p 15-25 (For primary document see N85-12907 04-12)
Avail: NTIS HC A06/MF A01

The Multispectral Electro-optical Stereo Scanner (MEOSS) mission, a CCD-based pushbroom camera system for multifold stereoscopy and sequential multispectral imaging is outlined. The MEOSS spectral band is from 570 to 700 nm, with 70 min ground resolution and 213 km swath width. It is part of the Stretched Rohini Satellites 2 mission. Scientific aims include test of line scan image rectification by multifold stereoscopy applying relative image distortion analysis and a mathematical model of satellite dynamics; and test of image correlation and data reduction scheme. The MEOSS will carry out stereo mapping for lithological and structural surveys, and cloud velocity measurements. Author (ESA)

N85-12909# Indian Space Research Organization, Bangalore. Satellite Center.
STATUS OF STRETCHED ROHINI SATELLITE SYSTEM (SROSS) AND AUGMENTED SATELLITE LAUNCH VEHICLE PROJECT (ASLV)
R. M. Vasagam *In* DFVLR Colloq. about Joint Projects within DFVLR/ISRO Cooperation Jun. 1984 p 27-30 (For primary document see N85-12907 04-12)
Avail: NTIS HC A06/MF A01

The Augmented Satellite Launch Vehicle (ASLV) project to put 150 kg spacecraft into 400 km altitude orbit, and the Stretched Rohini Satellite System (SROSS) series of 10 kg payload satellites are described. The ASLV is on schedule for a 1984/early 1985 launch. The SROSS payload interface aspects are decided, but orbital parameters, data utilization, and payload operation must be determined. Author (ESA)

N85-12910# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany).
THE MONOCULAR ELECTRO-OPTICAL STEREO SCANNER EXPERIMENT (MEOSS)
F. Lanzl *In its* Colloq. about Joint Projects within DFVLR/ISRO Cooperation Jun. 1984 p 31-39 (For primary document see N85-12907 04-12)
Avail: NTIS HC A06/MF A01

The Monocular Electro-optical Stereo Scanner (MEOSS) experiment for generation of threefold stereoscopic linescan imagery from space; investigation of procedures for image rectification; and investigation of correlation accuracies over land and cloud fields is outlined. Products include rectified linescan images and stereo triplets (1:1,000,000); orthophotos and orthostereo triplets (1:500,000); and heights and cross track velocities of cloud fields. The instrument is a CCD stereoscopic line scan camera operating at 570 to 700 nm, with 8 bit radiometric resolution and LANDSAT MSS compatible geometrical resolution. Author (ESA)

N85-12911# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany).
OVERVIEW OF AUTONOMOUS PAYLOAD CONTROL EXPERIMENT
W. Markwitz and G. Mayer *In its* Colloq. about Joint Projects within DFVLR/ISRO Cooperation Jun. 1984 p 41-62 (For primary document see N85-12907 04-12)
Avail: NTIS HC A06/MF A01

A project to test onboard data management and transfer concepts is described. Objectives include development and in-orbit evaluation of techniques for onboard orbit and attitude determination using data from multiple onboard sensors; development and testing of onboard algorithms and onboard/ground softwares; and testing of packet telemetry data management procedures. Author (ESA)

N85-12912# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany).
PRESENTATION OF INDIAN SPACE RESEARCH ORGANIZATION (ISRO)/DFVLR COOPERATION
H. Oettl and Y. S. Rajan (Indian Space Research Organization, Bangalore) *In its* Colloq. about Joint Projects within DFVLR/ISRO Cooperation Jun. 1984 p 63-69 ref (For primary document see N85-12907 04-12)
Avail: NTIS HC A06/MF A01

Indian and West German joint programs including the Monocular Electro-optical Stereo Scanner mission, Autonomous Payload Control Experiment, computer networking projects, and preparation of spread-F experiments are summarized. Test facilities, mission planning, satellite operations, and ground stations are described. Communication experiments at 20/30 GHz, materials and structures experiments, and microwave remote sensing data interpretation are mentioned. Author (ESA)

N85-12913# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany).
ONGOING ACTIVITIES IN THE FIELD OF COMMUNICATION AT DFVLR
H. Haeberle and H. Oettl *In its* Colloq. about Joint Projects within DFVLR/ISRO Cooperation Jun. 1984 p 71-76 (For primary document see N85-12907 04-12)
Avail: NTIS HC A06/MF A01

Projects concerning mobile communications for airborne, seaborne and landborne vehicles (mostly low bit rates or voice) including emergency systems are summarized. Fixed communication links for high bit rates are described. These services are intented for computer networks, TV and sound transmission for conference networks, and commercial transmission of TV and radio channels for direct reception. Author (ESA)

N85-12914# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany).
FEASIBILITY STUDY OF A SATELLITE-BORNE 90 GHz RADIOMETER
F. Heel and H. Kietzmann *In its* Colloq. about Joint Projects within DFVLR/ISRO Cooperation Jun. 1984 p 77-93 refs (For primary document see N85-12907 04-12)
Avail: NTIS HC A06/MF A01

A satellite-borne 90 GHz radiometer to observe the Earth's surface and cloud fields, to acquire rainfall data, and to determine the water content of clouds and fog is considered. The discernibility of sand, vegetation, concrete (built-up areas) and water, using their radiation temperature contrasts under different atmospheric conditions is discussed. Computer simulations reveal diminishing contrasts between object classes as humidity increases. The high attenuation effect of rain excludes discrimination of the four classes by the proposed instrument. Flight data from 700 and 2000 m altitude on radiation temperatures do not all correspond with calculated data. For an instrument flown on a Rohini satellite, a null-balancing design is suggested. Author (ESA)

N85-12915# Centre National d'Etudes Spatiales, Toulouse (France). Dept. d'Etudes Missions et Systemes.
A MARS DUST SAMPLE RETURN MISSION
O. Grosjean 12 Jul. 1984 41 p refs In FRENCH; ENGLISH summary
(CNES-CT/PMF/APS/EMS-177) Avail: NTIS HC A03/MF A01

Strategies to collect dust from Mars atmosphere are discussed. The mission concept is based on the fact that in the vicinity of the martian perihelion, great dust storms obstruct the atmosphere completely, throwing particles up to 60 km altitude. In the first approach the probe can gather dust from an elliptical orbit around Mars, and it stays in orbit for 2 years waiting for the storms and for the return-window opportunity toward Earth. In the second approach the dust catcher is a fly-by spacecraft, which skims the upper martian atmosphere with high navigation accuracy. The first option has definite advantages in spite of the larger propulsion required. Author (ESA)

N85-12916# Centre National d'Etudes Spatiales, Toulouse (France). Future Projects Missions Div.
INTERSTELLAR MISSION [MISSION INTERSTELLAIRE]

Murielle Boyer 25 Jun. 1984 113 p In FRENCH
Avail: NTIS HC A06/MF A01

The technology required for an unmanned spacecraft to reach the nearest star in less than a century is examined. The average mission velocity must be at least 0.043c, implying a specific impulse of at least 100,000s. The only types of propulsion which can provide that capacity are fission, fusion and antimatter. An improvement of at least 100 times on present performances must be assured. The telecommunication problem is comparatively less important. A CO2 laser in the band of 9 to 12 microns can assure communication with Earth. No navigation problems are expected. Author (ESA)

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

No abstracts in this category.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air)*.

N85-12917# Centre National d'Etudes Spatiales, Toulouse (France). Secretariat General.
LAUNCHING SYSTEMS [LES SYSTEMES DE LANCEMENTS]
Marcel Gilli Feb. 1984 60 p refs
(CNES-NT-111) Avail: NTIS HC A04/MF A01

Launch vehicles operational in 1984 are reviewed. Launch system development in Brazil, China, India, Japan, the USA, the U.S.S.R., and Europe is described. Commercial aspects, including Ariane and space shuttle price policies are discussed. Author (ESA)

N85-13696*# Lunar and Planetary Inst., Houston, Tex.
NASA-AMES VERTICAL GUN Status Report
Peter H. Schultz *In its* Activities at the Lunary and Planetary Inst. 30 Jun. 1984 9 p (For primary document see N85-13694 04-88)
Avail: NTIS HC A05/MF A01 CSCL 14B

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N85-12918*# Iowa Univ., Iowa City. Dept. of Physics and Astronomy.
[REDUCTION AND ANALYSIS OF DATA FROM THE PLASMA WAVE INSTRUMENTS ON THE IMP-6 AND IMP-8 SPACECRAFT] Final Report
Donald A. Gurnett and Roger R. Anderson Jan. 1983 28 p refs
(Contract NAS5-26125)
(NASA-CR-175127; NAS 1.26:175127) Avail: NTIS HC A03/MF A01 CSCL 22B

The primary data reduction effort during the reporting period was to process summary plots of the IMP 8 plasma wave data and to submit these data to the National Space Science Data Center. Features of the electrostatic noise are compared with simultaneous observations of the magnetic field, plasma and energetic electrons. Spectral characteristics of the noise and the results of this comparison both suggest that in its high frequency part at least the noise does not belong to normal modes of plasma waves but represents either quasi-thermal noise in the non-Maxwellian plasma or artificial noise generated by spacecraft interaction with the medium. B.W.

N85-12919# Committee on Science and Technology (U. S. House).
THE EXPENDABLE LAUNCH VEHICLE COMMERCIALIZATION ACT
Washington GPO 1984 120 p Hearings before the Subcomm. on Space Sci. and Appl. of the Comm. on Sci. and Technol., 98th Congr., 1st and 2nd Sess., No. 85, 18 Nov. 1983 and 29 Mar. 1984
(GPO-30-838) Avail: Subcommittee on Space Science and Applications

The Department of Transportation will serve as the lead agency in the transfer of Expendable Launch Vehicles (ELV) to the private sector. The roles of the FAA, Coast Guard and materials Transportation Bureau were discussed. B.G.

N85-12920*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
OIL-FLOW STUDY OF A SPACE SHUTTLE ORBITER TIP-FIN CONTROLLER
Vernon T. Helms, III Dec. 1983 56 p refs
(NASA-TM-86276; L-15750; NAS 1.15:86276) Avail: NTIS HC A04/MF A01 CSCL 22B

Possible use of tip-fin controllers instead of a vertical tail on advanced winged entry vehicles was examined. Elimination of the vertical tail and using tip-fins offers the advantages of positive yaw control at high angles of attack and a potential weight savings. Oil-flow technique was used to obtain surface flow patterns on a tip-fin installed on a 0.01-scale Space Shuttle orbiter model for the purpose of assessing the extent of flow interference effects on the wing and tip-fin which might lead to serious heating problems. Tests were conducted in air at Mach 10 for a free-stream Reynolds numbers of .000113 at 20, 30, and 40 degree angle of attack and sideslip angles of 0 and 2 degree. Elevon deflections of -10, 0, and 10 degree and tip-fin control-surface deflections of 0, 20, and 40 degree were employed. Test results were also used to aid in the interpretation of heating data obtained on a Shuttle orbiter tip-fin on another model in a different facility. A limited comparison of oil-flow patterns and heat-transfer data is included. It was determined that elevon deflection angles from -10 to 10 degree and sideslip angles up to 2 degree have very little effect on tip-fin surface flow patterns. Also, there is a minimum of interference between the tip-fin and the wing. The most significant flow interactions occur on the tip-fin onboard surface as a result of its control-surface deflections. Author

N85-12921*# Martin Marietta Corp., Bethesda, Md.
SELECTED TETHER APPLICATIONS IN SPACE: AN ANALYSIS OF FIVE SELECTED CONCEPTS Final Report
31 Jul. 1984 206 p
(Contract NAS8-35499)
(NASA-CR-171222; NAS 1.26:171222) Avail: NTIS HC A10/MF A01 CSCL 22B

Ground rules and assumptions; operations; orbit considerations/dynamics; tether system design and dynamics; functional requirements; hardware concepts; and safety factors are examined for five scenarios: tethered effected separation of an Earth bound shuttle from the space station; tether effected orbit boost of a spacecraft (AXAF) into its operational orbit from the shuttle; an operational science/technology platform tether deployed from space station; a tether mediated rendezvous involving an OMV tether deployed from space station to rendezvous with an aerobraked OTV returning to geosynchronous orbit from a payload delivery mission; and an electrodynamic tether used in a dual motor/generator mode to serve as the primary energy storage facility for space station. A.R.H.

N85-12922*# Martin Marietta Aerospace, Denver, Colo.
DEFINITION OF TECHNOLOGY DEVELOPMENT MISSIONS FOR EARLY SPACE STATION SATELLITE SERVICING. VOLUME 1: EXECUTIVE SUMMARY Final Report
Nov. 1984 93 p 2 Vol.
(NASA-CR-171228; NAS 1.26:171228; SSS-FR-04-01-Vol-1) Avail: NTIS HC A05/MF A01 CSCL 22B

The Executive Summary volume 1, includes an overview of both phases of the Definition of Technology Development Missions for Early Space Station Satellite Servicing. The primary purpose of Phase 1 of the Marshall Space Flight Center (MSFC) Satellite Servicing Phase 1 study was to establish requirements for demonstrating the capability of performing satellite servicing activities on a permanently manned Space Station in the early 1990s. The scope of Phase 1 included TDM definition, outlining of servicing objectives, derivation of initial Space Station servicing support requirements, and generation of the associated programmatic schedules and cost. The purpose of phase 2 of the satellite servicing study was to expand and refine the overall understanding of how best to use the manned space station as a test bed for demonstration of satellite servicing capabilities. B.W.

N85-12923*# Martin Marietta Aerospace, Denver, Colo.
DEFINITION OF TECHNOLOGY DEVELOPMENT MISSIONS FOR EARLY SPACE STATION SATELLITE SERVICING. VOLUME 2: TECHNICAL Final Report
D. A. Cable, C. A. Diewald, T. C. Hills, T. J. Parmentier, R. A. Spencer, and G. E. Stone Nov. 1984 170 p 2 Vol.
(Contract NAS8-35042)
(NASA-CR-171229; NAS 1.26:171229; SSS-FR-04-01-Vol-2) Avail: NTIS HC A08/MF A01 CSCL 22B

Volume 2 contains the Technical Report of the approach and results of the Phase 2 study. The phase 2 servicing study was initiated in June 1983, and is being reported in this document. The scope of the contract was to: (1) define in detail five selected technology development missions (TDM); (2) conduct a design requirement analysis to refine definitions of satellite servicing requirements at the space station; and (3) develop a technology plan that would identify and schedule prerequisite precursor technology development, associated. STS flight experiments and space station experiments needed to provide onorbit validation of the evolving technology. B.W.

N85-12924*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LAUNCH SUMMARY FOR 1978 - 1982
H. Kent Hills Jan. 1984 106 p
(NASA-TM-87375; NSSDC/WDC-A-R/S-84-01; NAS 1.15:87375) Avail: NTIS HC A06/MF A01 CSCL 22A

Data pertinent to the launching of space probes, soundings rockets, and satellites presented in tables include launch date, time, and site; agency rocket identification; sponsoring country or countries; instruments carried for experiments; the peak altitude achieved by the rockets; and the apoapsis and periapsis for satellites. The experimenter or institution involved in the launching is also cited. A.R.H.

N85-12925# Societe Nationale Industrielle Aerospatiale, Paris (France). Div. des Engins Tactiques.
TACTICAL MISSILES TECHNOLOGIES. RESEARCH AND PROSPECTIVES [TECHNOLOGIES DES MISSILES TACTIQUES: RECHERCHES ET PERSPECTIVES D'AVENIR]
Michel Berger 1984 26 p In FRENCH; ENGLISH summary
(SNIAS-841-320-101) Avail: NTIS HC A03/MF A01

The evolution of Missile technology up to the year 2000 is discussed. Propulsion, computerized simulation, guidance, construction materials, military payloads, electromagnetic and optoelectronic sensors, inertial sensors, and data processing are considered. Author (ESA)

N85-12926# AEG-Telefunken, Wedel (West Germany). Fachbereich Neue Technologien, Raumfahrt.
SPACE KNOW-HOW, TWENTY YEARS' SPACE EXPERIENCE
1984 17 p Original contains color illustrations
Avail: NTIS HC A02/MF A01

Photographs of solar array construction and power conditioning systems, and drawings of various satellites are presented. Space activities of AEG-Telefunken are summarized. Author (ESA)

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

N85-12927# Committee on Science and Technology (U. S. House).
REVIEW OF SPACE SHUTTLE REQUIREMENTS, OPERATIONS, AND FUTURE PLANS
Harry S. Dawson, Jr. Washington GPO Oct. 1984 45 p refs Rept. presented by the Subcomm. on Space Sci. and Appl. of the Comm. on Sci. and Technol., 98th Congr., 2nd Sess., Oct. 1984
(GPO-39-101) Avail: Subcommittee on Space Science and Applications

The following issues were discussed: long term plans; STS organization and management; launch rate trends; government use of ELV's; user perceptions; orbiter turn around times; operating costs; pricing policies; need for additional orbiters; hardware improvements; second generation Space Shuttles; spare parts and logistics support; and flight safety. B.G.

N85-12928# Committee on Science and Technology (U. S. House).
RESULTS OF SPACE SHUTTLE FLIGHT 41-C
Washington GPO 1984 23 p Hearing before the Committee on Science and Technology, 98th Congr., 2nd Sess., No. 83, 15 May 1984
(GPO-36-092) Avail: Committee on Science and Technology

The crew of the eleventh space transportation flight and the project manager of the solar maximum repair mission are congratulated. Aspects of the mission, including operational problems, are reviewed using a film taken during the flight. For individual titles, see N85-12929 through N85-12930.

N85-12929# Committee on Science and Technology (U. S. House).
STATEMENT OF CAPTAIN ROBERT L. CRIPPEN, USN, COMMANDER OF SPACE SHUTTLE FLIGHT 41-C; FRANCIS R. SCOBEE, PILOT; DOCTOR GEORGE D. NELSON, MISSION SPECIALIST; TERRY J. HART, MISSION SPECIALIST; AND DOCTOR JAMES D. VAN HOFTEN, MISSION SPECIALIST; ACCOMPANIED BY FRANK CEPOLLINA, SOLAR MAXIMUM REPAIR MISSION PROJECT MANAGER, GODDARD SPACE FLIGHT CENTER
In its Results of Space Shuttle Flight 41-C 1984 p 3-10 (For primary document see N85-12928 04-16)
Avail: Committee on Science and Technology CSCL 22A

The performance of the space shuttle Challenger, its direct insertion into orbit, and the deployment of the long duration exposure facility with its 57 experiments are described by the crew of the eleventh space transportation system flight. Other features of the mission discussed include the rendezvous, capture, and repair of the solar maximum mission spacecraft; operations of the manned maneuvering unit and the mechanical arm; and problems encountered when using the T-pad. Cameras and other equipment employed during the mission are also considered. A.R.H.

N85-12930# Committee on Science and Technology (U. S. House).
STATEMENT OF FRANK CEPOLLINA, SOLAR MAXIMUM REPAIR MISSION PROJECT MANAGER, GODDARD SPACE FLIGHT CENTER
In its Results of Space Shuttle Flight 41-C 1984 p 11-20 (For primary document see N85-12928 04-16)
Avail: Committee on Science and Technology CSCL 22A

Technical parameters seen in four weeks of solar maximum mission spacecraft checkout and observatory calibration are reported by the manager of the solar maximum mission repair project. Improved pointing accuracy and stability as well as the ability to use TDRS as a real time capability facilitated the acquisition of four continuous hours of data on a gigantic flare eruption. Opinions of the flight captain on possible rain impact damage to the tiles on the shuttle and real damage to the brakes on roll-out are presented. Potential missions for refuelling and repairing satellites are discussed as well as the operation of toilet facilities and the reaction to eating irradiated foods. Ecomonic factors are also considered. A.R.H.

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

No abstracts in this category.

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

N85-12931*# Allied Bendix Aerospace, Teterboro, N.J. Guidance Systems Div.
AUTONOMOUS MOMENTUM MANAGEMENT FOR SPACE STATION Final Report, 1 Oct. 1983 - 31 Aug. 1984
E. Hahn 15 Oct. 1984 70 p refs
(Contract NAS8-35349)
(NASA-CR-174065; NAS 1.26:174065) Avail: NTIS HC A04/MF A01 CSCL 22B

Momentum management for the CDG planar space platform is discussed. It is assumed that the external torques on the space station are gravity gradient and aerodynamic, both have bias and cyclic terms. The integrals of the cyclic torques are the cyclic momenti which will be stored in the momentum storage actuator. Techniques to counteract the bias torques and center the cyclic momentum and gravity gradient desaturation by adjusting vehicle attitude, aerodynamic desaturation using solar panels and radiators and the deployment of flat plates at the end of long booms generating aerodynamic torques are investigated. E.A.K.

N85-12932*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CONCEPTUAL DESIGN FOR SCALED TRUSS ANTENNA FLIGHT EXPERIMENT
Wendell H. Lee Nov. 1984 40 p refs
(NASA-TM-85804; L-15838; NAS 1.15:85804) Avail: NTIS HC A03/MF A01 CSCL 22B

The conceptual design for a scaled truss antenna structures experiment program (STASEP) is presented. The hardware analysis of the scaled truss antenna structure (STAS) was performed by interactive design and evaluation of advanced spacecraft (IDEAS) computer aided, interactive, design and analysis program. Four STAS's were designed to be launched by the Shuttle, tested by using the space technology experiments platform (STEP) and space transportation system (STS), and then free flown in short lifetime orbits. Data were gathered on deployment, structural characteristics, geometric accuracies, thermal performance, and drag and lifetime as an orbiting spacecraft. Structural and thermal properties were determined for the STAS, including mass properties, thermal loading, structural natural frequencies, and mode shapes. The necessary analysis, scaling, and ground testing are discussed. E.A.K.

N85-12933*# Bendix Corp., Teterboro, N.J. Guidance Systems Div.
AUTONOMOUS MOMENTUM MANAGEMENT FOR SPACE STATION, EXHIBIT A Final Report, 1 Oct. 1983 - 31 Aug. 1984
E. Hahn 15 Oct. 1984 70 p refs
(Contract NAS8-35349)
(NASA-CR-171256; NAS 1.26:171256) Avail: NTIS HC A04/MF A01 CSCL 22B

The report discusses momentum management for the CDG Planar Space Platform. The external torques on the Space Station are assumed to be gravity gradient and aerodynamic with both having bias and cyclic terms. The integrals of the cyclic torques are the cyclic momenti which will be stored in the momentum storage actuator. Various techniques to counteract the bias torques and center the cyclic momentum were investigated including gravity gradient desaturation by adjusting vehicle attitude, aerodynamic desaturation using solar panels and radiators and the deployment of flat plates at the end of long booms generating aerodynamic torques. Author

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

N85-12934*# Essex Corp., Huntsville, Ala.
THE DESIGN, FABRICATION AND DELIVERY OF A SPACELAB NEUTRAL BUOYANCY INSTRUMENT POINTING SYSTEM (IPS) MOCKUP Final Report
Charles N. VanValkenburgh 8 Nov. 1984 66 p
(Contract NAS8-35480)
(NASA-CR-171233; NAS 1.26:171233) Avail: NTIS HC A04/MF A01 CSCL 14B

Underwater simulations of EVA contingency operations such as manual jettison, payload disconnect, and payload clamp actuation were used to define crew aid needs and mockup pecularities and characteristics to verify the validity of simulation using the trainer. A set of mockup instrument pointing system tests was conducted and minor modifications and refinements were made. Flight configuration struts were tested and verified to be operable by the flight crew. Tasks involved in developing the following end items are described: IPS gimbal system, payload, and payload clamp assembly; the igloos (volumetric); spacelab pallets, experiments, and hardware; experiment, and hardware; experiment 7; and EVA hand tools, support hardware (handrails and foot restraints). The test plan preparation and test support are also covered. A.R.H.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N85-12935*# Colorado State Univ., Fort Collins. Dept. of Mechanical Engineering.
ION THRUSTER PERFORMANCE MODEL
John R. Brophy Dec. 1984 135 p refs
(Grant NGR-06-002-112)
(NASA-CR-174810; NAS 1.26:174810) Avail: NTIS

HC A07/MF A01 CSCL 21C

A model of ion thruster performance is developed for high flux density, cusped magnetic field thruster designs. This model is formulated in terms of the average energy required to produce an ion in the discharge chamber plasma and the fraction of these ions that are extracted to form the beam. The direct loss of high energy (primary) electrons from the plasma to the anode is shown to have a major effect on thruster performance. The model provides simple algebraic equations enabling one to calculate the beam ion energy cost, the average discharge chamber plasma ion energy cost, the primary electron density, the primary-to-Maxwellian electron density ratio and the Maxwellian electron temperature. Experiments indicate that the model correctly predicts the variation in plasma ion energy cost for changes in propellant gas (Ar, Kr and Xe), grid transparency to neutral atoms, beam extraction area, discharge voltage, and discharge chamber wall temperature. The model and experiments indicate that thruster performance may be described in terms of only four thruster configuration dependent parameters and two operating parameters. The model also suggests that improved performance should be exhibited by thruster designs which extract a large fraction of the ions produced in the discharge chamber, which have good primary electron and neutral atom containment and which operate at high propellant flow rates. B.W.

N85-12936*# TRW Defense and Space Systems Group, Redondo Beach, Calif.
SPACE POWER DISTRIBUTION SYSTEM TECHNOLOGY. VOLUME 3: TEST FACILITY DESIGN Final Report
D. Kent Decker, Marshall D. Cannady, John E. Cassinelli, Bertrand F. Farber, Charles Lurie, Gerald W. Fleck, Jack W. Lepisto, Alan Messner, and Paul F. Ritterman Mar. 1983 89 p 3 Vol.
(Contract NAS8-33198)
(NASA-CR-171230; NAS 1.26:171230; TRW-34579-6001-UT-00-Vol-3) Avail: NTIS HC A05/MF A01 CSCL 22B

The AMPS test facility is a major tool in the attainment of more economical space power. The ultimate goals of the test facility, its primary functional requirements and conceptual design, and the major equipment it contains are discussed. R.S.F.

N85-12937*# Hughes Research Labs., Malibu, Calif.
ION THRUSTER SYSTEM (8-CM) CYCLIC ENDURANCE TEST Final Report, 20 Sep. 1978 - 31 Jan. 1984
C. R. Dulgeroff, J. R. Beattie, R. L. Poeschel, and J. Hyman, Jr. Oct. 1984 138 p refs
(Contract NAS3-21741)
(NASA-CR-174745; NAS 1.26:174745) Avail: NTIS HC A07/MF A01 CSCL 21C

This report describes the qualification test of an Engineering-Model 5-mN-thrust 8-cm-diameter mercury ion thruster which is representative of the Ion Auxiliary Propulsion System (IAPS) thrusters. Two of these thrusters are scheduled for future flight test. The cyclic endurance test described herein was a ground-based test performed in a vacuum facility with a liquid-nitrogen-cooled cryo-surface and a frozen mercury target. The Power Electronics Unit, Beam Shield, Gimal, and Propellant Tank that were used with the thruster in the endurance test are also similar to those of the IAPS. The IAPS thruster that will undergo the longest beam-on-time during the actual space test will be subjected to 7,055 hours of beam-on-time and 2,557 cycles during the flight test. The endurance test was successfully concluded when the mercury in the IAPS Propellant Tank was consumed. At that time, 8,471 hours of beam-on-time and 599 cycles had been accumulated. Subsequent post-test-evaluation operations were performed (without breaking vacuum) which extended the test values to 652 cycles and 9,489 hours of beam-on-time. The Power Electronic Unit (PEU) and thruster were in the same vacuum chamber throughout the test. The PEU accumulated 10,268 hr of test time with high voltage applied to the operating thruster or dummy load. Author

N85-12938# Brookhaven National Lab., Upton, N. Y. Materials Chemistry and Energy Conversion Div.
SOLID ELECTROLYTES FOR MEDIUM TEMPERATURE STEAM ELECTROLYSIS
E. Findl, F. Kulesa, and E. Montoneri (Politechnico di Milano) Apr. 1984 24 p refs Presented at 4th IEA Annex Workshop on Electrolytic Hydrogen Prod., Toronto, 23 Jul. 1984
(DE84-014384; BNL-34838; CONF-84014384; CONF-840771-1) Avail: NTIS HC A02/MF A01

A research program has been initiated to screen and select electrolyte materials for use in steam electrolyzers in the 300 to 600 C temperature range. Screening of a significant number of acid anhydrides, hydroxides, oxides, and phosphates for their electrolytic conductivity properties is underway. Of the binary materials examined to date, only polymerized phosphoric acid, immobilized on an H(+) substituted zeolite, shows promise. A substantial number of ternary compounds remain to be synthesized and evaluated. DOE

N85-12939# Los Alamos Scientific Lab., N. Mex.
SPACE NUCLEAR SAFETY PROGRAM Progress Report, Nov. 1983
S. E. Bronisz, comp. Jun. 1984 34 p
(Contract W-7405-eng-36)
(DE84-015074; LA-10126-PR) Avail: NTIS HC A03/MF A01

Studies related to the use of (238) PuO2 in radioisotope power systems are discussed. Topics discussed include: safety verification impact tests; an explosion test; a fragment test; leaking fueled clads; the effects of fresh water and seawater on PuO2 pellets; and impact tests of a 5 watt radioisotope thermoelectric generator. DOE

N85-12940# Los Alamos Scientific Lab., N. Mex.
SPACE NUCLEAR SAFETY PROGRAM Progress Report, Dec. 1983
S. E. Bronisz, comp. Jun. 1984 17 p
(Contract W-7405-eng-36)
(DE84-015064; LA-10134-PR) Avail: NTIS HC A02/MF A01

Studies related to the use of (238) PuO2 in radioisotope power systems are discussed. Results from safety verification tests including impact tests are presented. DOE

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

No abstracts in this category.

24 COMPOSITE MATERIALS

Includes laminates.

N85-12941*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
TOUGH COMPOSITE MATERIALS
Louis F. Vosteen, comp., Norman J. Johnson, comp., and Louis A. Teichman, comp. Washington Dec. 1984 379 p refs Workshop held in Hampton, Va., 24-26 May 1983
(NASA-CP-2334; L-15857; NAS 1.55:2334) Avail: NTIS HC A17/MF A01 CSCL 11D

Papers and working group summaries are presented which address composite material behavior and performance improvement. Topic areas include composite fracture toughness and impact characterization, constituent properties and interrelationships, and matrix synthesis and characterization. For individual titles, see N85-12942 through N85-12965.

N85-12942*# National Bureau of Standards, Washington, D.C. Polymers Div.
CHARACTERIZATION OF INTERLAMINAR CRACK GROWTH IN COMPOSITES WITH THE DOUBLE CANTILEVER BEAM SPECIMEN
Donald L. Hunston *In* NASA. Langley Research Center Tough Composite Mater. Dec. 1984 p 3-16 (For primary document see N85-12941 04-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

A project to examine the double cantilever beam specimen as a quantitative test method to assess the resistance of various composite materials to interlaminar crack growth is discussed. A second objective is to investigate the micromechanics of failure for composites with tough matrix resins from certain generic types of polymeric systems: brittle thermosets, toughened thermosets, and thermoplastics. Emphasis is given to a discussion of preliminary results in two areas: the effects of temperature and loading rate for woven composites, and the effects of matrix toughening in woven and unidirectional composites. M.G.

N85-12943*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CHARACTERIZING DELAMINATION RESISTANCE OF TOUGHENED RESIN COMPOSITES
T. Kevin OBrien *In its* Tough Composite Mater. Dec. 1984 p 17-31 refs (For primary document see N85-12941 04-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

The delamination resistance of toughened resin composites was studied. Both the edge delamination test (EDT) and the double-cantilever-beam (DCB) test provided a useful ranking of improvements in delamination resistance between brittle and tough resin composites. Several layups were designed for the edge delamination test to cover a wide range of mixed-mode conditions. The DCB and the various layups of the EDT were then used to characterize the interlaminar fracture behavior of brittle and toughened resin composites subjected to both static and cyclic loading. M.G.

N85-12944*# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
COMPOSITE MATERIALS CHARACTERIZATION AND DEVELOPMENT AT AFWAL
C. E. Browning *In* NASA. Langley Research Center Tough Composite Mater. Dec. 1984 p 33-60 (For primary document see N85-12941 04-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

The development of test methodology for characterizing matrix dominated failure modes is discussed emphasizing issues of matrix cracking, delamination under static loading, and the relationship of composite properties to matrix properties. Both strength characterization and classical techniques of linear elastic fracture mechanics were examined. Materials development studies are also discussed. Major areas of interest include acetylene-terminated and bismaleimide resins for 350 to 450 deg use, thermoplastics development, and failure resistant composite concepts. M.G.

N85-12945*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EFFECT OF IMPACT DAMAGE AND OPEN HOLES ON THE COMPRESSION STRENGTH OF TOUGH RESIN/HIGH STRAIN FIBER LAMINATES
Jerry G. Williams *In its* Tough Composite Mater. Dec. 1984 p 61-80 refs (For primary document see N85-12941 04-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

Tests to assess the performance of composite structures damaged by impact or containing local discontinuities such as cutouts are discussed. In particular, two plate specimen test configurations which were developed to define the serverity of compression strength reduction are described; one for impact damage and the other open hole specimens. The test technique for impact specimens involves damaging the plate at selected energies, measuring the size of damage by ultrasonic C-scan techniques and measuring the residual strength in a compression load test. Open-hole specimen compression tests are conducted for several different hole diameters and the failure strain and load and mode of failure recorded. The plate specimen used in these tests is designed with length, width, thickness and laminate stiffness to ensure that overall plate buckling is not responsible for initiating failure. M.G.

N85-12946*# Washington Univ., St. Louis, Mo.
EFFECTS OF CONSTITUENT PROPERTIES ON COMPRESSION FAILURE MECHANISMS
H. Thomas Hahn *In* NASA. Langley Research Center Tough Composite Mater. Dec. 1984 p 81-98 refs (For primary document see N85-12941 04-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

Compression failure mechanisms were investigated through the analysis of matrix-embedded fiber bundles. The use of fiber bundle specimens can provide much needed information on compression failure mechanisms because failure of the bundle is well contained and can be monitored during testing. The method can clearly distinguish between buckling-induced failure and shear-induced failure. The results indicate that WY and T300 graphite fibers and E-glass fiber fail in buckling while the high-modulus P75S graphite fiber fails in shear. Buckling-induced failure becomes more evident with low-modulus fiber in softer epoxy. M.G.

N85-12947*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THE EFFECT OF MATRIX AND FIBER PROPERTIES ON IMPACT RESISTANCE
Wolf Elber *In its* Tough Composite Mater. Dec. 1984 p 99-121 refs (For primary document see N85-12941 04-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

The basic material properties which control impact damage are identified and testing techniques are assessed. It is demonstrated that static indentation tests can provide better information about failure processes than impact tests, and they are simpler to conduct. In thin and thick laminates, it was found that the matrix shear strength controls the onset of delamination damage and that the fiber strength controlled the penetration phase. In thin laminates, tough matrices do little to enhance impact resistance. M.G.

N85-12948*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FUNDAMENTAL STUDIES OF COMPOSITE TOUGHNESS
Kenneth J. Bowles *In* NASA. Langley Research Center Tough Composite Mater. Dec. 1984 p 125-136 (For primary document see N85-12941 04-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

Evaluation of drop weight impact testing of neat resin and crossplied graphite fiber reinforced composites resulted in three conclusions: (1) during impact of cross-ply laminates, resin properties appear to influence the extent and mechanism of damage propagation; (2) by itself, neat resin strain to fracture is not a controlling influence on resin or composite fracture toughness; and (3) impact failure energy of neat resin plates can give a misleading indication of the resin contribution to composite impact behavior because of differences in the magnitude of diaphragm action in the two systems. Both geometric and composite constituent materials properties influence the drop weight impact resistance of crossplied composite plates. The matrix influence appears to be reflected in the incipient damage mechanism and the propagation of damage. M.G.

N85-12949*# Wyoming Univ., Laramie. Composite Materials Research Group.
INVESTIGATION OF TOUGHENED NEAT RESINS AND THEIR RELATIONS TO ADVANCED COMPOSITE MECHANICAL PROPERTIES
R. S. Zimmerman *In* NASA. Langley Research Center Tough Composite Mater. Dec. 1984 p 137-151 (For primary document see N85-12941 04-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

Four epoxies (Hercules 3502, Hercules 2220-1 and 2220-3, and Ciba-Geigy Fibredux 914 epoxy) were evaluated to judge their merits within the ACEE program and also to provide material property input for a micromechanics finite element program. A casting procedure was developed for the four matrix systems mentioned and mechanical properties were studied at three test temperatures and two moisture contents. A scanning electron microscope study was performed to catalogue fracture surfaces for the unreinforced (neat) epoxies. In addition, tension testing, shear testing, a limited amount of fracture toughness testing, and thermal expansion coefficient and moisture expansion coefficient testing were carried out. Mechanical material properties were generated for input into a micromechanics program and to characterize these four matrix systems. R.S.F.

N85-12950*# Hexcel, Dublin, Calif.

CONSTITUENT PROPERTY - COMPOSITE PROPERTY RELATIONSHIPS IN THERMOSET MATRICES

J. Diamant and R. J. Moulton *In* NASA. Langley Research Center Tough Composite Mater. Dec. 1984 p 159-171 refs (For primary document see N85-12941 04-24)

Avail: NTIS HC A17/MF A01 CSCL 11D

A procedure to effectively screen and evaluate resins for aerospace structures and advanced composites is described. The following conclusions were advanced: (1) laminate damage tolerance correlates positively with neat resin G sub IC; (2) TGDDM/DDS resins can be toughened; (3) using butadiene-nitrile rubbers, neat resin G sub IC and ultimate strain increase with increasing nitrile content, with the number of chemically reactive groups per molecule, and with increasing molecular weight; (4) better balance of properties combined with high G sub IC may be achieved by using tough glassy thermoplastics instead of rubbers to modify TGDDM/DDS resins; (5) both toughening mechanisms require good phase separation with an effective interphase; (6) the kind and the amount of thermoplastic modifier remain to be selected; and (7) presently only about a fourfold increase in G sub IC was achieved, whereas a forty fold increase is sought; modification of the matrix backbone and of crosslinking is required. R.S.F.

N85-12951*# General Electric Co., Schenectady, N. Y. Corporate Research and Development Center.

THE EFFECT OF CROSS-LINK DENSITY ON THE TOUGHENING MECHANISM OF ELASTOMER-MODIFIED EPOXIES

R. A. Pearson and A. F. Yee *In* NASA. Langley Research Center Tough Composite Mater. Dec. 1984 p 173-194 (For primary document see N85-12941 04-24)

Avail: NTIS HC A17/MF A01 CSCL 11D

A DGEBA epoxide resin (EPON 828) was elastomer modified by using three different carboxyl terminated butadiene acrylonitrile copolymers. The fracture toughness of these elastomer modified epoxies was measured in terms of the critical strain energy release rate, G sub IC. The toughening mechanism was elucidated using a tensile dilatometry technique. A plot of volume strain versus longitudinal strain often reveals the types of micromechanical deformations occurring in the uniaxial tensile specimen up to yield. Several microscopy techniques were employed to corroborate the tensile dilatometry results. The role of matrix ductility on the toughening mechanism of elastomer modified epoxies was investigated. By reducing the cross link density with various equivalent weight epoxide resins. Fracture toughness was again measured in terms of G sub IC. The characterization of the toughening mechanism was performed using a uniaxial tensile dilatometry technique and corroborated using various microscopy techniques. R.S.F.

N85-12952*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

FREE VOLUME CONSIDERATIONS IN THERMOPLASTIC AND THERMOSETTING RESINS

Robert F. Landel, A. Gupta, J. Moacanin, D. Hong, F. D. Tsay, S. Chen, S. Chung, R. F. Fedors, and M. Cigmecioglu *In* NASA. Langley Research Center Tough Composite Mater. Dec. 1984 p 195-208 refs (For primary document see N85-12941 04-24)

Avail: NTIS HC A17/MF A01 CSCL 11D

The direct measurement of physical aging and of the volume changes which go on during the course of this aging is discussed. Data on PMMA showing its physical aging as measured by its stress relaxation response and the accompanying volume changes are presented. An indication of how one can measure the free volume both directly from the volume change itself and relatively directly via a new technique is given. The application of this new technique (electron spin resonance spectroscopy) to other polymer systems is demonstrated. R.S.F.

N85-12953*# Rensselaer Polytechnic Inst., Troy, N. Y.

THE CHEMICAL NATURE OF THE FIBER/RESIN INTERFACE IN COMPOSITE MATERIALS

R. Judd Diefendorf *In* NASA. Langley Research Center Tough Composite Mater. Dec. 1984 p 209-225 refs (For primary document see N85-12941 04-24)

Avail: NTIS HC A17/MF A01 CSCL 11D

Carbon fiber/epoxy resin composites are considered. The nature of the fiber structure and the interaction that occurs at the interface between fiber and matrix are emphasized. Composite toughness can be improved by increased axial tensile and compressive strengths in the fibers. The structure of carbon fibers indicates that the fiber itself can fail transversely, and different transverse microstructures could provide better transverse strengths. The higher surface roughness of lower modulus and surface-treated carbon fibers provides better mechanical interlocking between the fiber and matrix. The chemical nature of the fiber surface was determined, and adsorption of species on this surface can be used to promote wetting and adhesion. Finally, the magnitude of the interfacial bond strength should be controlled such that a range of composites can be made with properties varying from relatively brittle and high interlaminar shear strength to tougher but lower interlaminar shear strength. R.S.F.

N85-12954*# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Nonmetallic Materials Div.

COMPOSITE PROPERTY DEPENDENCE ON THE FIBER, MATRIX, AND THE INTERPHASE

Lawrence T. Drzal *In* NASA. Langley Research Center Tough Composite Mater. Dec. 1984 p 227-243 refs (For primary document see N85-12941 04-24)

Avail: NTIS HC A17/MF A01 CSCL 11D

The matrix properties of a difunctional epoxy, Epon 828, were varied. The Hercules type A fiber was also utilized in this investigation. The fiber and the interface between fiber and matrix were examined in terms of shear strength. Micrographs of the epoxy matrix are presented. R.S.F.

N85-12955*# Union Carbide Corp., Parma, Ohio.

NEWER CARBON FIBERS AND THEIR PROPERTIES

Roger Bacon *In* NASA. Langley Research Center Tough Composite Mater. Dec. 1984 p 245-257 (For primary document see N85-12941 04-24)

Avail: NTIS HC A17/MF A01 CSCL 11D

The newer carbon fibers that are either on the market or coming in the near future are described. The structure of carbon fibers is discussed along with the relationship between structure and physical property. Finally, how different types of structure are designed by control of process parameters is described. R.S.F.

N85-12956*# Narmco Materials, Inc., Anaheim, Calif.

DEVELOPMENT OF A HETEROGENEOUS LAMINATING RESIN

Rex Gosnell *In* NASA. Langley Research Center Tough Composite Mater. Dec. 1984 p 261-272 refs (For primary document see N85-12941 04-24)

Avail: NTIS HC A17/MF A01 CSCL 11D

The feasibility of toughening the common types of matrix resins such as Narmco 5208 by utilizing a heterogeneous additive was examined. Some basic concepts and principles in the toughening of matrix resins for advanced composites were studied. The following conclusions were advanced: (1) the use of damage volume as a guide for measurement of impact resistance appears to be a valid determination; (2) short beam shear is a good test to determine the effect of toughening agents on mechanical properties; (3) rubber toughening results in improved laminate impact strength, but with substantial loss in high temperature dry and wet strength; (4) in the all-epoxy systems, the polycarbonate toughening agent seemed to be the most effective, although hot-wet strength is sacrificed; ABS was not as effective; and (5) in general, the toughened all-epoxy systems showed better damage tolerance, but less hot-wet strength; toughened bismaleimides had better hot-wet strength. R.S.F.

N85-12957*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
MODIFIED EPOXY COMPOSITES
W. J. Gilwee *In* NASA. Langley Research Center Tough Composite Mater. Dec. 1984 p 273-284 refs (For primary document see N85-12941 04-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

The properties of a rubber-modified experimental epoxy resin and a standard epoxy as composite matrices were studied. In addition, a brominated epoxy resin was used in varying quantities to improve the fire resistance of the composite. The experimental resin was tris-(hydroxyphenyl)methane triglycidyl ether, known as tris epoxy novolac (TEN). The standard epoxy resin used was tetraglycidyl 4,4'-diaminodiphenyl methane (TGDDM). The above resins were modified with carboxyl-terminated butadiene acrylonitrile (CTBN) rubber. It is concluded that: (1) modification of TEN resin with bromine gives better impact resistance than rubber modification alone; (2) 25% rubber addition is necessary to obtain significant improvement in impact resistance; (3) impact resistance increases with bromine content; (4) impact velocity does not significantly affect the energy absorbed by the test sample; (5) Tg did not decline with rubber modification; and (6) TEN resin had better hot/wet properties than TGDDM resin. R.S.F.

N85-12958*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MORPHOLOGY AND DYNAMIC MECHANICAL PROPERTIES OF DIGLYCIDYL ETHER OF BISPHENOL-A TOUGHENED WITH CARBOXYL-TERMINATED BUTADIENE-ACRYLONITRILE
Su-Don Hong, Shirley Y. Chung, Robert F. Fedors, Jovan Moacanin, and Amitava Gupta *In* NASA. Langley Research Center Tough Composite Mater. Dec. 1984 p 285-294 refs (For primary document see N85-12941 04-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

The fracture toughness of an incorporation of a carboxyl-terminated butadiene acrylonitrile (CTBN) elastomer in diglycidyl ether bisphenol A (DGEBA) resin was investigated. Measurements of dynamic mechanical properties, scanning electron microscopy and small-angle X-ray scattering were carried out to characterize the state of cure, morphology and particle size and size distribution of the neat resins and their graphite fiber reinforced composites. B.G.

N85-12959*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MATRIX RESIN CHARACTERIZATION IN CURED GRAPHITE COMPOSITES USING DIFFUSE REFLECTANCE-FTIR
Philip R. Young and A. C. Chang (Kentron Technical Center, Hampton, Va.) *In its* Tough Composite Mater. Dec. 1984 p 295-316 refs (For primary document see N85-12941 04-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

The chemical characterization of cured graphite fiber reinforced polymer matrix composites is complicated by the fact that the resins are insoluble and the composites are apaque. Standard analyses which depend either on the ability to dissolve the sample or to detect transmitted radiation are impossible. As a result, data reported on environmentally exposed composites primarily concern macroscopic information such as weight loss or changes in selected mechanical properties. Diffuse reflectance in combination with fourier transform infrared spectroscopy was developed to gain a basic chemical understanding of composite and adhesive behavior. Several composite and adhesive materials were characterized before and after environmental exposure. In each case significant changes in resin molecular structure were observed and correlated with changes in mechanical properties, providing new insights into material performance. B.G.

N85-12960*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SOLVENT RESISTANT THERMOPLASTIC COMPOSITE MATRICES
P. M. Hergenrother, B. J. Jensen, and S. J. Havens (Kentron International, Inc., Hampton, Va.) *In its* Tough Composite Mater. Dec. 1984 p 317-335 refs (For primary document see N85-12941 04-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

The following approaches improved the solvent resistance and raised the Tg of thermoplastics: end-capping aligomers with ethynyl groups; incorporating ethynyl groups pendent along the polymer chain; and correcting polymers containing pendent ethynyl groups with a low molecular weight diethynyl compound. The following conclusions were reached: (1) film and composite properties off an ethynyl-terminated sulfone were better than those of UDEL (trademark); (2) fracture energy of an ethynyl-terminated sulfone was lower than that of UDEL (trademark); (3) residual palladium in the cured ethynyl-terminated sulfone lower the thermooxidative stability of the cured resin; (4) the properties of a phenoxy resin were altered considerably by placing pendent ethynyl groups along the polymer chain; and (5) property trade-offs must be considered when thermoplastics are modified via reactant groups. B.G.

N85-12961*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THERMOPLASTIC/MELT-PROCESSABLE POLYIMIDES c27
T. L. St.Clair and H. D. Burks *In its* Tough Composite Mater. Dec. 1984 p 337-355 refs (For primary document see N85-12941 04-24)
Avail: NTIS HC A17/MF A01 CSCL 11B

Several polyimides were prepared which show promise for aircraft composite applications. This was achieved through a systematic polymer synthesis program where the glass transition temperatures were greatly lowered when compared to the older polyimide systems. Several of the materials were shown to be hot-melt processable and are attractive matrix resin candidates especially in light of their high g(sub Ic) values. At least two of these polyimides are available for evaluation and others are on the research horizon. Author

N85-12962*# Aerotherm Acurex Corp., Mountain View, Calif.
ALIPHATIC-AROMATIC HETEROCYCLICS AS POTENTIAL THERMOPLASTICS FOR COMPOSITE MATRICES c27
Chad B. Delano and Charles J. Kiskiras *In* NASA. Langley Research Center Tough Composite Mater. Dec. 1984 p 357-377 (For primary document see N85-12941 04-24)
Avail: NTIS HC A17/MF A01 CSCL 11B

The successful development of impact- and solvent-resistant thermoplastic systems for glass graphite composites is particularly attractive because of the demonstrated streamlined manufacturability of such composites. Hypothetically, thermoplastics only require simple heating and cooling cycles for component manufacture, whereas thermosets require precise, and possibly extended heating schedules which must be consistent with the cure chemistry. The sensitivity of the majority of existing thermoplastics to aircraft fluids and other solvents preempts their serious consideration in aircraft components. This is the basic reason that Acurex proposed insolubility in common solvents as the starting point. The target properties are summarized as follows: (1) prepreg properties (use of conventional prepregging equipment, 6+ months shelf stability, processability, and thermoformability); and (2) composite properties (-54 C to 93 C capability, good mechanical properties, good environmental properties, and impact resistance). B.G.

N85-12963*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

COMPOSITE FRACTURE TOUGHNESS AND IMPACT CHARACTERIZATION
In its Tough Composite Mater. Dec. 1984 p 381-383 (For primary document see N85-12941 04-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

The basic threat to the more widespread use of composites in aircraft primary structure is the problem of residual strength in the presence of damage. Specific problem areas that need to be addressed include the following: (1) modeling/understanding composite failure (impact: relate strain energy release rate to strain-to-failure, open hole compression: relate shear crippling to strain-to-failure, and account for variables such as thickness and stacking sequence); (2) micromechanics models; (3) consider the use of hybrid combinations, both interply and intraply, using graphite, Kevlar, and glass; and (4) modeling/understanding the role of the interface. Solving these problems involves a multidisciplinary approach including dynamics, structural stability, composite mechanics, and fracture mechanics. B.G.

N85-12964*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CONSTITUENT PROPERTIES AND INTERRELATIONSHIPS
In its Tough Composite Mater. Dec. 1984 p 385-388 (For primary document see N85-12941 04-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

The requirements and recommendations of constituent properties and relationships are: (1) goals/requirement statement; (2) better operational definition of toughness; (3) assess limitations of current micromechanics models/procedures; (4) explicity assess currently known resin toughening mechanisms and determine their relative importance to matrix resins; (5) method to define the interphase region in situ; (6) assess thermodynamic compatibility of any new resin with the fiber; and (7) model polymer systems. B.G.

N85-12965*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MATRIX SYNTHESIS AND CHARACTERIZATION
In its Tough Composite Mater. Dec. 1984 p 389-391 (For primary document see N85-12941 04-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

The role of NASA in the area of composite material synthesis; evaluation techniques; prediction analysis techniques; solvent-resistant tough composite matrix; resistance to paint strippers; acceptable processing temperature and pressure for thermoplastics; and the role of computer modeling and fiber interface improvement were discussed. B.G.

N85-12966*# Rensselaer Polytechnic Inst., Troy, N. Y. School of Engineering.
COMPOSITE STRUCTURAL MATERIALS Semiannual Progress Report, 30 Sep. 1983 - 30 Apr. 1984
George S. Ansell, Robert G. Loewy, and Stephen E. Wiberly Aug. 1984 174 p refs Sponsored in cooperation with AFOSR (Grant NGL-33-018-003)
(NASA-CR-174077; NAS 1.26:174077; SAPR-46) Avail: NTIS HC A08/MF A01 CSCL 11D

The development and application of filamentary composite materials, is considered. Such interest is based on the possibility of using relatively brittle materials with high modulus, high strength, but low density in composites with good durability and high tolerance to damage. Fiber reinforced composite materials of this kind offer substantially improved performance and potentially lower costs for aerospace hardware. Much progress has been made since the initial developments in the mid 1960's. There were only limited applied to the primary structure of operational vehicles, mainly as aircrafts. For individual titles, see N85-12967 through N85-12977.

N85-12967*# Rensselaer Polytechnic Inst., Troy, N. Y.
CHEMICAL MODIFICATION OF THE SURFACE OF HIGH MODULUS CARBON FIBERS
In its Composite Struct. Mater. Aug. 1984 p 11-25 refs (For primary document see N85-12966 04-24)
Avail: NTIS HC A08/MF A01 CSCL 11D

The deposition of selected monomers on the surface of high modulus carbon fibers was studied. The fundamental principles which provide the basis for the design of a predictable interfacial bond between carbon fibers and polymeric matrices are described. E.A.K.

N85-12968*# Rensselaer Polytechnic Inst., Troy, N. Y.
FATIGUE IN COMPOSITE MATERIALS
In its Composite Struct. Mater. Aug. 1984 p 27-34 refs (For primary document see N85-12966 04-24)
Avail: NTIS HC A08/MF A01 CSCL 11D

The deformation and failure behavior of graphite/epoxy tubes under biaxial loading was investigated. The increase of basic understanding of and provide design information for the bi-axial response of graphite/epoxy composites to fatigue loads are considered. E.A.K.

N85-12969*# Rensselaer Polytechnic Inst., Troy, N. Y.
EXPERIMENTAL AND THEORETICAL STUDIES OF MOISTURE AND TEMPERATURE EFFECTS ON THE MECHANICAL PROPERTIES OF GRAPHITE/EPOXY LAMINATES AND NEAT RESINS
S. S. Sternstein *In its* Composite Struct. Mater. Aug. 1984 p 35-38 (For primary document see N85-12966 04-24)
Avail: NTIS HC A08/MF A01 CSCL 11D

The properties of high performnce composites which are strongly dependent on the physical properties of the matrix resin were studied. Moisture adversely affect the properties of both neat epoxy resin and epoxy matrix composites. Inhomogeneous swelling as to the moisture degradation of mechanical properties, both in the neat resin and the composite. It is postulated that the postcuring process can change structure/moisture interactions and partially alleviate its adverse effects. The study is directed toward are understanding of the physical/mechanical/thermodynamic aspects of this problem. E.A.K.

N85-12970*# Rensselaer Polytechnic Inst., Troy, N. Y.
NUMERICAL INVESTIGATION OF THE MICROMECHANICS OF COMPOSITE FRACTURE
In its Composite Struct. Mater. Aug. 1984 p 39-62 refs (For primary document see N85-12966 04-24)
Avail: NTIS HC A08/MF A01 CSCL 11D

A generalized program for the two-dimensional analysis of static crack growth problems was developed and is being tested. In addition to a detailed examination and development of fracture criteria needed to track cracks in composites at the micromechanical level, the program employs fully automatic finite element mesh generation. This is an entirely new approach in program structure that is being taken to allow for the automatic tracking of discrete crack growth. The maximum strain energy density criterion (T-criterion) was found to be a good alternative to the minimum strain energy density criterion (S-criterion). R.S.F.

N85-12971*# Rensselaer Polytechnic Inst., Troy, N. Y.
FREE-EDGE FAILURES OF COMPOSITE LAMINATES
In its Composite Struct. Mater. Aug. 1984 p 63-64 (For primary document see N85-12966 04-24)
Avail: NTIS HC A08/MF A01 CSCL 11D

The free-edge delamination of graphite/epoxy laminates under static loading is being analyzed to obtain fundamental understanding of the continuum mechanics involved. The analyses are conducted by idealizing the material response of each ply in the laminate as homogenous, linear elastic, and anisotropic. A generalized plane strain elastic boundary value problem was formulated to investigate the energy variation of such a body. R.S.F.

N85-12972*# Rensselaer Polytechnic Inst., Troy, N. Y.
QUANTIFICATION OF SAINT-VENANT'S PRINCIPLE FOR A GENERAL PRISMATIC MEMBER
In its Composite Struct. Mater. Aug. 1984 p 67-88 refs (For

primary document see N85-12966 04-24)
Avail: NTIS HC A08/MF A01 CSCL 11D

A semi-analytic finite element method for finding the decay rates of edge effects in anisotropic layered plates was extended to the treatment of prismatic members of an arbitrary cross section composed of any number of anisotropic elements. The displacement fields corresponding to the decay rates with positive real part were determined for a homogenous graphite/epoxy plate two units thick. The behavior of a rectangular beam is also considered. R.S.F.

N85-12973*# Rensselaer Polytechnic Inst., Troy, N. Y.
IMPROVED BEAM THEORY FOR ANISOTROPIC MATERIALS
In its Composite Struct. Mater. Aug. 1984 p 89-99 refs (For primary document see N85-12966 04-24)
Avail: NTIS HC A08/MF A01 CSCL 11D

The behavior of beams made of anisotropic material was investigated in order to develop an appropriate model of such behavior. Closed form solutions of the problem were derived using two alternative approaches. In the first approach, the axial displacements are expanded as a series of eigenwarpings. In the second approach, the axial stresses are expanded as a series of eigenwarpings. A finite element solution was also derived using the same displacement field as in the first approach. R.S.F.

N85-12974*# Rensselaer Polytechnic Inst., Troy, N. Y.
VARIATION OF RESIN PROPERTIES THROUGH THE THICKNESS OF CURED SAMPLES
In its Composite Struct. Mater. Aug. 1984 p 101-126 refs (For primary document see N85-12966 04-24)
Avail: NTIS HC A08/MF A01 CSCL 11D

It is the purpose of this work to gain knowledge of the glassy materials used as matrices in composites and to study the homogeneity resulting from the curing process. An attempt is made to link the glass transition quantitatively with the presence of a given material. Expoxy resins containing various amounts of hardener (TGDDM/DDS system) were cured in a muffle furnace at 473 K for seven hours. The glass transition temperature, T sub g versus weight minus percent of hardener in the epoxy resin were measured. A limit was rapidly reached in T sub g at only two percent hardener. Thus, the glass transition of the fully cured epoxy-amine matrix seems not much different from the epoxide-epoxide cure. The T sub g versus cure-time for the epoxide-epoxide reaction was also studied. My 720 was cured by itself in an oil bath at 473 K for different lengths of time. The T sub g was found to increase exponentially with the cure time, and a maximum T sub g of about 450 K was reached after eleven hours. The reaction was found to be inhibited by running the sample under argon. B.W.

N85-12975*# Rensselaer Polytechnic Inst., Troy, N. Y.
ACCURATE MEASUREMENT OF HEAT CAPACITY BY DIFFERENTIAL SCANNING CALORIMETRY
In its Composite Struct. Mater. Aug. 1984 p 127-145 refs (For primary document see N85-12966 04-24)
Avail: NTIS HC A08/MF A01 CSCL 11D

Experience with high quality heat capacity measurement by differential scanning calorimetry is summarized and illustrated, pointing out three major causes of error: (1) incompatible thermal histories of the sample, reference and blank runs; (2) unstable initial and final isotherms; (3) incompatible differences between initial and final isotherm amplitudes for sample, reference and blank runs. Considering these problems, it is shown for the case of polyoxymethylene that accuracies in heat capacity of 0.1 percent may be possible. Author

N85-12976*# Rensselaer Polytechnic Inst., Troy, N. Y.
INITIAL SAILPLANE PROJECT: THE RP-1 c39
In its Composite Struct. Mater. Aug. 1984 p 147 (For primary document see N85-12966 04-24)
Avail: NTIS HC A08/MF A01 CSCL 20K

The annual static loading tests were made on the assembled wing/fuselage structure of the RP-1 sailplane. Simple wing bending and wing bending/torsion tests up to about four G's were made, using sand bag loading on the inverted aircraft. Bending a torsion deflections were measured and compared to those obtained in previous years' tests. It appears that the structure is retaining its original strength and stiffness very well. This aircraft has been disassembled and stored on the Jonsson Engineering Center under ambient, indoor conditions of temperature and humidity. B.W.

N85-12977*# Rensselaer Polytechnic Inst., Troy, N. Y.
SECOND SAILPLANE PROJECT: THE RP-2 c39
In its Composite Struct. Mater. Aug. 1984 p 149-154 (For primary document see N85-12966 04-24)
Avail: NTIS HC A08/MF A01 CSCL 20K

Progress has been made on the design fabrication and installation of a tension carry-through linkage between the aft parts of the port and starboard wings to resist forward bending deflection on the RP-2 sailplane. In addition, towhook/release mechanisms, landing gear and wheel brake assembly, compound curved sandwich composite fuselage shells and an enclosed trailer to house and transport the complete disassembled aircraft, have all undergone various stages of design, fabrication, installation and testing. B.W.

N85-12978# Brown Univ., Providence, R. I. Div. of Engineering.
WORK HARDENING OF SIMPLE TWO PHASE COMPOSITES
R. T. Beck Jun. 1984 40 p refs
(Contract DE-AC02-80ER-10556)
(DE84-014629; DOE/ER-10556/99) Avail: NTIS HC A03/MF A01

For composites with a lightly hardening matrix, work hardening occurs whenever primary slip regions are inhibited from developing. Elastic inclusions impose approximately the same restrictions as rigid inclusions on the internal deformation of the matrix. The macroscopic stress-strain curve obtained for these, however, is considerably lower than that for the rigid inclusion case (except at very small concentrations). Interparticle distance effects on the macroscopic hardening are most apparent for cases where the matrix is lightly hardening. The characterization of the matrix material by a simple phenomenological plasticity theory does not seem to predict the hardening response of metal alloys with small volume fractions of hard phase. DOE

N85-12979# Avions Marcel Dassault-Breguet Aviation, Saint-Cloud (France). Lab. des Techniques Nouvelles.
TEST REPORT NO. 17.208: STATISTICS OF THE BASIC CHARACTERISTICS OF CARBON-EPOXY COMPOSITES Final Report [ESSAI 17.208: STATISTIQUE SUR LES CARACTERISTICS DE BASE DES COMPOSITES CARBONE-EPOXY (TRACTION)]
F. Henriot and J. Levesque 15 Mar. 1984 57 p In FRENCH
(DGT-23.426/A) Avail: NTIS HC A04/MF A01

The uniformity of the mechanical properties of cured samples of preimpregnated lots of carbon-epoxy composites was studied in order to establish correlations applicable to quality control inspection procedures. The tensile strength variation coefficient is 7.8% in preimpregnated samples, sufficient to assure minimum reception requirements. Author (ESA)

N85-12980# Societe Nationale Industrielle Aerospatiale, Suresnes (France). Section Materiaux.
INFLUENCE OF RELAXATION ON THE MECHANICAL CHARACTERISTICS OF A CARBON-EPOXY COMPOSITE. REPORT NO. 45.427/1 [INFLUENCE DE LA RELAXATION SUR LES CARACTERISTIQUES MECANIQUES D'UN COMPOSITE CARBONE EPOXY, PROCES-VERBAL NO. 45.427/1]
G. Hilaire and B. Soulezelle 2 Mar. 1984 15 p In FRENCH
(Contract STPA-83.96.003)
Avail: NTIS HC A02/MF A01

The influence of polymerization cycles on the time-temperature physical evolution of carbon-epoxy molded plates was studied. The molded bodies were curved, assymetric and formed by 8 plies of carbon-epoxy T300/5208 preimpregnated material oriented perpendicularly. The evolution of the deformation with aging was determined. No influence of the polymerization cycle is detected. Author (ESA)

N85-12981# Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
QUALITY ASSURANCE OF COMPOSITE MATERIALS, TEST REPORT NO. 45-649/F [ASSURANCE QUALITE DES MATERIAUX COMPOSITES, PROCES-VERBAL NO. 45-649/F]
13 Mar. 1984 63 p refs In FRENCH
(Contract STPA-83.96.003)
Avail: NTIS HC A04/MF A01

Characterization of preimpregnated fibers by physical chemical methods, to replace traditional mechanical tests on composites was investigated. Environmental influences on preimpregnated fibers and composites; test methods required to characterize epoxy-carbon preimpregnated materials; and the influence of the manufacturing procedures on the control parameters were examined. It is shown that control of preimpregnated control is insufficient to assure composite quality. The proposed tests, however, are helpful to characterize new products and to provide quality investigation tools. Author (ESA)

N85-12982# Technische Univ., Berlin (West Germany). Inst. fuer Nichmetallische Werkstoffe.
PREPARATION OF SINTER-ACTIVE SILICON CARBIDE POWDERS Final Report, Apr. 1983
Heide Landfermann and Hans Hausner Bonn Bundesministerium fuer Forschung und Teconologie Sep. 1984 83 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-84-189; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 17.50

The sintering behavior of alpha silicon carbide was investigated. Shrinkage was determined during the various sintering stages in relation to the sintering additive. The influence of the additives on densification was analyzed via the microstructural development; the sintering additive was incorporated into the body to be sintered by different methods. During the effort to optimize the material properties, defined quantities of impurities were added and their maximum limit was determined with regard to densification. Processing steps were investigated to obtain a material with a small grain size. Author (ESA)

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N85-12983# California Univ., Livermore. Lawrence Livermore Lab.
GAS CHROMATOGRAPHIC SEPARATION OF HYDROGEN ISOTOPES USING METAL HYDRIDES
Frederick T. Aldridge 9 May 1984 53 p refs
(Contract W-7405-eng-48)
(DE84-014455; UCID-20111) Avail: NTIS HC A04/MF A01

A study was made of the properties of metal hydrides which may be suitable for use in chromatographic separation of hydrogen isotopes. Sixty-five alloys were measured, with the best having a hydrogen-deuterium separation factor of 1.35 at 60C. Chromatographic columns using natural abundance hydrogen as starting material. DOE

N85-12984*# National Aeronautics and Space Administration, Washington, D. C.
ELECTROKINETIC POTENTIAL AND STABILITY OF SIC SUSPENSIONS IN ELECTROLYTE SOLUTIONS
B. V. Eremenko and V. O. Kolesnik Jul. 1984 8 p refs Transl. into ENGLISH from Visnik Kiivskoho Univ., Ser. Khim. (USSR), no. 13, 1972 p 53-56 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-77492; NAS 1.15:77492) Avail: NTIS HC A02/MF A01 CSCL 07D

The dependence of zeta potential on pH of an aqueous Si carbide suspension was studied by an electroosmosis method. The effect of pH on the Si carbide electrical double layer is attributed to the participation of H and OH ions in the surface dissociation reactions of weak acid OH groups on an oxidized carbide surface. Maximum stability of the suspensions was observed at maximum negative zeta potentials. Author

N85-12985# Sandia Labs., Albuquerque, N. Mex. Exploratory Battery Div.
INVESTIGATION OF THE DISSOLUTION OF CaCrO4 IN MOLTEN LiCl-KCl EUTECTIC
R. A. Guidotti, F. W. Reinhardt, D. R. Tallant, and K. L. Higgins Jun. 1984 37 p refs
(Contract DE-AC04-76DP-00789)
(DE84-016394; SAND-83-2272) Avail: NTIS HC A03/MF A01

The rate of dissolution of CaCrO4 in molen LiCl-KCl eutectic was measured by laser Raman spectroscopy. Increasing the calcining temperature of the CaCrO4, for use in Ca/CaCrO4/Fe thermal batteries resulted in an increase in the average particle size, with a concomitant reduction in the rate of dissolution in the molten eutectic. It was found that the CaCrO4 obtained from a commercial supplier contains a component that is resistant to dissolution in the molten eutectic; this resistance caused the commercial product to be less reactive than the prepared CaCrO4 in Ca/CaCrO4/Fe thermal batteries. Catholyte mixes formulated with characterized CaCrO4 samples were tested in batteries under various load conditions. The performance of batteries containing the finely divided GENDD CaCrO4 was inferior under light load conditions to that of batteries with coarser material. The poor performance was the result of enhanced dissolution kinetics of the finer CaCrO4, which caused greater generation of heat from chemical reactions at the anode. DOE

N85-12986# Massachusetts Inst. of Tech., Cambridge. Dept. of Chemical Engineering.
HIGH-TEMPERATURE STEAM ELECTROLYSIS: TECHNICAL AND ECONOMIC EVALUATION OF ALTERNATIVE PROCESS DESIGNS
M. A. Liepa and A. Borhan Jul. 1984 12 p refs Presented at 5th World Hydrogen Energy Conf., Toronto, 15 Jul. 1984
(Contract DE-AC02-76CH-00016)
(DE84-015702; BWL-35022; CONF-840702-8) Avail: NTIS HC A02/MF A01

A high-temperature water-vapor electrolysis (HTE) unit operating at an average temperature of 1000 C was integrated into a preliminary process design using electrical and thermal energy derived from coal. Process variation with either steam or water feeds under isothermal or nonisothermal HTE operation were considered. Operating and capital costs were estimated for each process flowsheet, with the lowest costs being obtained for operation with high steam conversions in the electrolyzer. Estimated hydrogen production costs were compared with estimates obtained from the literature for other hydrogen production processes. The estimated HTE hydrogen production costs ranged from $0.17 to $0.22 per standard cubic meter of hydrogen produced ($13 to $17/GJ, using the higher heating value), assuming $1.90/GJ for thermal energy and $13.90/GJ for electrical energy. DOE

N85-12987# University of Southern California, Marina del Rey. Inst. for Physics and Imaging Science.
ADVANCES IN ROOM-TEMPERATURE SOLID-STATE GAMMA-RAY SPECTROMETRY
Jan S. Iwanczyk 1983 7 p refs Presented at the IEEE Conf., Amman, Jordan, 25-28 Apr. 1983
(Contract DE-AM03-76SF-00113)
(DE84-015944; CONF-8304195-2) Avail: NTIS HC A02/MF A01

This article presents a review and analysis of different concepts of gamma-ray spectrometry using room-temperature solid-state detectors. The classical approach involving the use of a charge-sensitive preamplifier and attempting to collect all the ionization charge produced by the gamma ray is analyzed and discussed in terms of the charge transport parameters of the most promising compound semiconductor materials. It is concluded that compound semiconductor detector materials having a large disparity between the (MU) tau products for electrons and holes (such as HgI2 and CdTe) will have rather poor energy resolution if the classical method of spectrometry requiring full charge collection is employed. DOE

N85-12988# Brookhaven National Lab., Upton, N. Y. Materials Chemistry and Energy Conversion Div.

HYDROGEN TECHNOLOGY EVALUATION CENTER AT BROOKHAVEN NATIONAL LABORATORY

P. D. Metz, M. Piraino, and R. W. Leight Apr. 1984 6 p refs Presented at the Intersoc. Energy Conversion Eng. Conf., San Francisco, 19-24 Aug. 1984
(Contract DE-AC02-76CH-00016)
(DE84-014099; BNL-34748; CONF-840804-26) Avail: NTIS HC A02/MF A01

Brookhaven National Laboratory (BNL), as part of the US Department of Energy Chemical/Hydrogen Energy Systems (C/HES) Program, is developing a Hydrogen Technology Evaluation Center. The purpose of the Center is to evaluate the advanced hydrogen energy system options which emerge from the C/HES base technology research activities. Initially, the Center is being used to investigate the production of hydrogen from solar energy via water electrolysis - the first of a series of system evaluations - via a coordinated program of system testing, computer simulation, and economic analysis. A PV-electrolyzer system, based on a 5-kW Solarex PV array and a 15 kW General Electric Solid Polymer Electrolyte (SPE) Electrolyzer, is in place and undergoing evaluation. After describing the Center and the activities planned for it, a synopsis of initial transient simulation and hardware characterization results for this system is given. DOE

N85-12989# Mound Lab., Miamisburg, Ohio.

COMPARISON STUDY OF ANALYTICAL METHODS FOR THE DETERMINATION OF FLUORIDE, CHLORIDE, AND BROMIDE IN PLASTICS

E. B. Nunn, M. D. Hale, C. Kinard, and W. M. Preston 16 Jul. 1984 9 p refs
(Contract DE-AC04-76DP-00053)
(DE84-015008; MLM-3163) Avail: NTIS HC A02/MF A01

Five standard samples containing 1 to 10 mg of each halogen were prepared for analysis. These samples and halogen free plastic were burned in a Parr bomb under 30 atmospheres of oxygen and collected in a sodium carbonate solution. The methods evaluated included ion chromatography for all three ions, a gravimetric method for Cl(-) and F(-), and a colorimetric method for Br(-). Ion chromatography was much faster and yielded better results. DOE

N85-12990# Texas A&M Univ., College Station. Dept. of Chemistry.

STUDY OF CATALYSTS AND MECHANISMS IN SYNTHESIS REACTIONS Progress Report

Jack H. Lunsford 1984 5 p
(Contract DE-AS05-76ER-05226)
(DE84-015025; DOE/ER-05226/2) Avail: NTIS HC A02/MF A01

Synthesis reactions were studied. Alcohol synthesis over supported metals and the generation of gas phase radicals at surfaces of catalytic interest were investigated. Alcohol synthesis was investigated to understand the origin of the large differences in activity of palladium which are observed when the support is varied or when alkali metal ions are added to the catalyst. The objective of the research on radical formation is to identify surface sites and reaction conditions which are favorable for the production of specific gas phase radicals. DOE

N85-12991# Iowa State Univ. of Science and Technology, Ames. Rare-Earth Information Center.

CRITICAL EVALUATION OF BINARY RARE EARTH DIAGRAMS Progress Report, 1 Dec. 1983 - 29 Feb. 1984

K. A. Gschneidner, Jr. and F. W. Calderwood Mar. 1984 101 p refs
(Contract W-7405-eng-82)
(DE84-014880) Avail: NTIS HC A06/MF A01

Crystal structures; phase diagrams; amorphous and non-equilibrium alloys; phase relationship as a function of pressure; and thermodynamic properties of rare earth-bismuth alloy systems are examined. B.G.

N85-12992# Argonne National Lab., Ill. Chemistry Div.

SEPARATION OF METAL SPECIES BY SUPPORTED LIQUID MEMBRANES

Pier R. Danesi 1984 71 p refs Presented at the 1st ACS Award Symp. on Separation Sci. and Technol., St. Louis, 8-13 Apr. 1984
(Contract W-31-109-eng-38)
(DE84-014536; CONF-840415-26) Avail: NTIS HC A04/MF A01

The works performed on the transport and separation properties of supported liquid membranes (SLM) are reviewed. The models and equations which describe the permeation through SLMs of metal species are described. These models were tested with various carriers absorbed on flat sheet and hollow fiber SLMs by measuring the permeation of several metal species of hydrometallurgical and nuclear interest. An equation for the separation factor of metal species in SLM processes and examples of separations of metal ions are reported. The possibility of bypassing the single stage character of SLM separations by using multilayer composite SLMs, arranged in series, is also analyzed. Finally, the factors which control the stability of SLMs are briefly discussed. DOE

N85-12993# Harvard Univ., Cambridge, Mass.

LAMINAR FLAME PROPAGATION/QUENCH FOR A PARALLEL-WALL DUCT

F. G. Carrier, F. E. Fendell, and P. S. Feldman 1984 24 p refs Presented at the 20th Intern. Symp. on Combust., Ann Arbor, Mich., 12-17 Aug. 1984 Prepared in cooperation with TRW Space Technology Labs., Redondo Beach, Calif.
(Contract DE-AC04-78ET-13329)
(DE84-009773; CONF-840801-10) Avail: NTIS HC A02/MF A01

Steady laminar isobaric two-dimensional propagation of a fuel-lean large-activation-temperature premixed flame between plane parallel (isothermal noncatalytic) walls is examined theoretically. A Shvab-Zeldovich engineering-type formulation, with a treatment of convective transport of species and heat in the manner of Oseen, is integrated numerically by quasilinearization/alternating-direction-implicit techniques. Of particular interest in this transcendentally nonlinear elliptical (convective-diffusive-reactive) boundary-value problem is how the flame speed (an eigenvalue) decreases as the well separation decreases, for different wall temperatures. At a finite wall separation the quenching distance is achieved, such that the flame speed goes abruptly to zero; this critical quenching distance is found to be smaller for hotter walls. This investigation seeks to lend credibility of principle to one possible strategy for reducing the level of unburned-hydrocarbon species exhausted from Otto-cycle-type cylinders. The primary source for hydrocarbon emissions is now generally acknowledged to be the failure of flame to propagate into the narrow piston crevice owing to heat loss to cold walls. Higher wall temperature at the piston crown and rings would seem to abet flame propagation and assist burn-up during the combustion event. DOE

N85-12994# West Virginia Univ., Morgantown. Dept. of Physics.

EXAFS AND MOESSBAUER STUDY OF SMALL METAL CLUSTERS ISOLATED IN RARE-GAS SOLIDS

P. A. Montano, G. K. Shenoy (Argonne National Lab.), T. I. Morrison (Argonne National Lab.), and W. Schulze (Fritz-Haber Inst. der Max-Planck-Gesellschaft, Berlin, West Germany) Jul. 1984 4 p refs Presented at the 3rd Intern. EXAFS Conf., Stanford, Calif.,

6-20 Jul. 1984
(Contract W-31-109-eng-38)
(DE84-015976; CONF-840764-4) Avail: NTIS HC A02/MF A01

The determination of the interatomic separation in small metal clusters is of great importance. Previously, there were several electron diffraction studies made to determine the lattice parameter for various cluster sizes. However, a simple interpretation of the electron diffraction data for small clusters often obscures the determination of the atomic separation. On the other hand, EXAFS provides a unique approach to such measurements on small clusters. A general program of isolating small metal clusters in rare-gas solids and measuring the atomic separation in them EXAFS was undertaken. Data are presented for clusters of Cr and Fe isolated in neon and those for Aq clusters in argon. In the case of Fe clusters isolated in argon and xenon, measurements of the isomer shift and the magnetic hyperfine field at Fe-57 nucleus were carried out using the Moessbauer effect. R.S.F.

N85-12995# Los Alamos Scientific Lab., N. Mex. Materials Chemistry Group.
STUDIES OF IGNITION AND COMBUSTION WAVE PROPAGATION IN EXOTHERMIC SYSTEMS USING HIGH-SPEED PHOTOGRAPHY
George F. Melton and Robert G. Behrens 1984 7 p refs
Presented at the 28th Ann. SPIE Tech. Symp., San Diego, Calif., 19-24 Aug. 1984 Submitted for publication
(Contract W-7405-eng-36)
(DE84-016482; LA-UR-84-2492; CONF-840872-21) Avail: NTIS HC A02/MF A01

High speed photography is a useful diagnostic tool for studying the propagation of adiabatic combustion waves in highly exothermic solid state chemical systems. Temperatures on the order of 1500 to 4000(0)C can be achieved within the combustion wave front as it traverses the solid chemical reactants. Wave front propagation rates on such systems are typically 0.5 to 10 cm/s. High speed photography (framing speeds of 400 to 2000 frames/s) was used to study the structure of the combustion wave, obtain quantitative combustion wave propagation rates, and to study the details of ignition of the combustion wave using 150 watt HF/DF laser radiation. Examples of photographic experiments are presented as well as examples of the chemical and physical information obtainable from these experiments. DOE

N85-12996# Utah Univ., Salt Lake City.
STUDY OF COMBUSTION AND FLAME PROCESSES INITIATED BY LASER-INDUCED MULTIPLE-PHOTON ABSORPTION Technical Progress Report
William A. Guillory 1984 4 p
(Contract DE-AC02-78ER-04695)
(DE84-017095; DOE/ER-04695/T2) Avail: NTIS HC A02/MF A01

The objective of this research program is to use the phenomenon of infrared multiple-photon absorption (MPA) to study elementary photochemical and photophysical processes occurring in flame and combustion systems. Emphasis is being placed on state-of-state energy transfer processes in medium-sized molecules and state-selective chemical reactions. DOE

N85-12997# Princeton Univ., N. J. Dept. of Chemistry.
PHOTOELECTROCHEMISTRY WITH CHEMICALLY MODIFIED ELECTRODES Progress Report, 1 Aug. 1983 - 31 Jul. 1984
Thomas G. Spiro 1984 10 p
(Contract DE-AC02-81ER-10861)
(DE84-016798; DOE/ER-10861/T1) Avail: NTIS HC A02/MF A01

Surface enhanced Raman spectroscopy (SERS) was used to study interactions of metalloporphyrins at electrode surfaces. SERS spectra were obtained for roughened Ag electrodes in contact with (Fe/sup III/PP)20 (PP = protoporphyrin) in aqueous solution and (Fe/sup III/PPDME)C1 (PPDME = protoporphyrin dimethylester) is acetonitrile. Metalloprotoporphyrin (MPP) electrode films were prepared by oxidative electropolymerization. The electropolymerized films had good electroactivity in contact with nonaqueous electrolytes, and the porphyrin groups were accessible to anions from the solution. Cyclic voltammetry of both ZnPP and FePP films placed in contact with aqueous electrolyte showed large anodic currents on the first scan, and no electroactivity thereafter. In the case of FePP, a small amount of O2 was detected prior to film inactivation by ring-disk voltammetry. Catalysis of H2 evolution by cobalt porphyrins in solution and in electrode films was studied. Electrolysis of aqueous Co prophyrins at the Co/sup II/I/potential was shown by gas chromotography to produce H2 at an accelerated rates. DOE

N85-12998# Brigham Young Univ., Provo, Utah.
SUPERCRITICAL FLUID CHROMATOGRAPHY/SUPERSONIC JET SPECTROSCOPY Progress Report, 1 May - 31 Jul. 1984
M. L. Lee and S. R. Goates 1984 18 p refs
(Contract DE-FG22-83PC-60807)
(DE84-016199; DOE/PC-60807/4) Avail: NTIS HC A02/MF A01

Developmental work in ring-size fractionation has resulted in design improvements for the supercritical fluid extractor/fractionator. Pressure, temperature, and effluent volumes for effective ring-size separation have been determined for simple mixtures of polycyclic aromatic compounds. The performance of supercritical fluid chromatography/mass spectrometry with n-pentane as the mobile phase been evaluated. Both electron-impact and chemical-ionization modes of operation worked well, but chemical-ionization gives the best results. Tuning of the mass spectrometer with introduction of the supercritical fluid was found to improve results. Light-scattering investigations of the flow from nozzles have led to improvements in the thermal, vacuum interface for the supersonic jet spectrometry and have begun to establish the conditions for proper expansions. Preliminary supersonic jet spectra of naphthalene with n-pentane as the carrier fluid show encouraging improvements of spectral resolution. DOE

N85-12999# Louisiana State Univ., Baton Rouge.
PHYSICO-CHEMICAL INVESTIGATION OF SOME AREAS OF FUNDAMENTAL SIGNIFICANCE TO BIOPHYSICS Annual Report, 1983 - 1984
S. P. McGlynn 15 Jul. 1984 87 p refs
(Contract DE-AS05-76EV-03018)
(DE84-016385; DOE/EV-03018/257) Avail: NTIS HC A05/MF A01

Research efforts are summarized on: laser photoacoustic spectroscopy of halogens, Rydberg states of methyl halides, characterization of metallodipyrromethenes, nonhydrogen bonded glasses, spectra of small polyatomic molecules, and photoionization of aromatics. DOE

N85-13000# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Hardthausen (West Germany). Abteilung Brennertechnologie.
MATHEMATICAL MODELS FOR THE BOILING DIAGRAM OF THE IDEAL TWO-COMPONENT MIXTURE
Wolfgang Moellenbruck May 1984 32 p refs In GERMAN; ENGLISH summary
(DFVLR-FB-84-22) Avail: NTIS HC A03/MF A01

Dependencies of the boiling diagram (boiling curve and dewing curve) and the vapor pressure diagram are pointed out using Dalton's and Raoult's law. Both diagrams are used to draw concentration enthalpy diagrams of mixtures for an absorption pump for refrigeration or heating. Author (ESA)

N85-13001# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany). Bereiche Neue Technologien.
DEVELOPMENT AND TESTING OF THIN FILM CELLS FOR HIGH TEMPERATURE WATER VAPOR ELECTROLYSIS Final Report, Sep. 1983
Guenther Dietrich, Hajo Hermeking, Alfred Koch, Wolfgang Julius Caesar Mueller, and Wolfgang Schaefer Bonn Bundesministerium fuer Forschung und Technologie Jul. 1984 96 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-84-146; ISSN-0340-7608) Avail: NTIS

HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 20

High temperature electrolysis (HTE) cells using thin Z+O2/Y2 O3 solid state electrolytes were manufactured and tested under real electrolysis conditions. The electrolytes were prepared by the electrochemical vapor deposition (EVD) method. The EVD method gives a reproducible deposition of electrolytes, which satisfies composition, crystal structure, oxygen ion conductivity requirements and gas-tightness under operating conditions of HTE. Tubular cells manufactured by this technique allow a simple gas inlet system and easy electrical series connection of single cells. Electrolysis experiments show reduced ohmic losses in such cells. Thin film technique in HTE leads to increased current densities and decreased operating temperatures at the same losses. Author (ESA)

N85-13002# Kernforschungsanlage, Juelich (West Germany). Inst. fuer Nukleare Sicherheitsforschung.

PRIAMUS, A COMPUTER PROGRAM FOR THE CALCULATION OF THERMOPHYSICAL PROPERTIES OF GAS MIXTURES CONTAINING O2, N2, CO, CO2, He, H2O, H2, CH4 [PRIAMUS: EIN RECHENPROGRAMM ZUR BESTIMMUNG THERMOPHYSIKALISCHER STOFFWERTE VON GASMISCHUNGEN AUS O2, N2, CO, CO7, He, H2O, H2 UND CH4]

R. Finken and R. Moormann May 1984 68 p refs In GERMAN; ENGLISH summary

(JUEL-1916; ISSN-0366-0885) Avail: NTIS HC A04/MF A01

The physical basis, the structure and the application of the computer code PRIAMUS (Properties of gas mixtures) are described. The PRIAMUS calculates the density, heat capacity, enthalpy, entropy and velocity of sound, viscosity, heat conductivity, diffusion coefficients, and Prandtl and Schmidt number of gas mixtures containing O2, N2, CO, CO2, He, H2O, H2 and CH4. The concepts of ideal gas and dilute gas are used. A Redlech-Kwong correction for real gases is selectable. The PRIAMUS is suitable for temperatures between 273 and 3000K and for pressures up to 100 bar. Author (ESA)

N85-13003# Imperial Coll. of Science and Technology, London (England). Computational Fluid Dynamics Unit.

COMBUSTION WAVES IN DISPERSED-2-PHASE MIXTURES

D. Brian Spalding May 1984 20 p refs Presented at Royal Inst. Fast Reactions in Energetic Mater. Meeting, 21-22 May 1984

(CFD/84/13) Avail: NTIS HC A02/MF A01

Combustion phenomena involving the dispersion of finely-divided fuel particles, suspended in a gas are discussed. The rate of chemical reaction often depends upon the relative velocity of the two phases, and this velocity depends on the presence of pressure waves which may be a consequence of the chemical reaction. Combustion phenomena in furnaces, diesel engines, rocket motors and guns all exhibit these interactions. Even when only a single (gaseous) phase is present, reactant and product often behave in a two phase manner, fragments of the one being mingled with the other. Numerical computation of unsteady-combustion wave phenomena arising when the exothermic chemical reaction takes place within a confined space is illustrated. Author (ESA)

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N85-13004 National Physical Lab., Teddington (England). Div. of Materials Applications.

A BIBLIOGRAPHY OF PUBLICATIONS ON CORROSION AND OXIDATION FROM UK GOVERNMENT LABORATORIES AT TEDDINGTON, 1924 - 1983

A. D. Mercer and W. M. Peace Jul. 1984 56 p Sponsored by UK Ministry of Industry Materials, Chemicals and Vehicles Requirement Board

(NPL-DMA(A)-82; ISSN-0143-7313) Copyright. Avail: Issuing Activity

Almost 400 publications concerning metal corrosion and oxidation are listed, with an index. Author (ESA)

N85-13005# Ames Lab., Iowa.

PARAMAGNETIC IMPURITY EFFECTS IN NMR DETERMINATIONS OF HYDROGEN DIFFUSION AND ELECTRONIC STRUCTURE IN METAL HYDRIDES. CERIUM IN YH-2 AND LaH-2.25

T. T. Phua, D. R. Torgeson, R. G. Barnes, R. J. Schoenberger, B. J. Beaudry, D. T. Peterson, M. Belhoul, G. A. Styles, and E. F. W. Seymour Apr. 1984 3 p Presented at the Intern. Symp. on the Properties and Applications of Metal Hydrides, Eilat, Israel, 9 Apr. 1984

(Contract W-7405-eng-82)

(DE84-014127; IS-M-479; CONF-8404106-6) Avail: NTIS HC A02/MF A01

A preliminary survey was conducted of the effects on the proton spin lattice relaxation time T1 resulting from the presence of controlled low levels of the Kramers ions Ce, Nd, Gd, Dy, and Er in YH2 and LaH/sub 2.25. The results for the case of Ce(3+) are reported. The Ce ion behaves most differently from Gd(3+), apparently because it is an extremely fast relaxing ion and because it has the smallest magnetic moment of all the rare earths. DOE

N85-13006*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

EFFECT OF HUMIDITY ON FRETTING WEAR OF SEVERAL PURE METALS

Hozumi Goto (Cleveland State Univ., Ohio) and Donald H. Buckley Dec. 1984 12 p refs

(NASA-TP-2403; E-2184; NAS 1.60:2403) Avail: NTIS HC A02/MF A01 CSCL 11F

Fretting wear experiments with several pure metals were conducted in air at various relative humidity levels. The materials used were iron, aluminum, copper, silver, chromium, titanium, and nickel. Each pure metal had a maximum fretting wear volume at a specific humidity level RH sub max that was not dependent on mechanical factors such as contact load, fretting amplitude, and frequency in the ranges studied. The weight loss due to fretting wear at RH sub max for each pure metal decreased with increasing heat of oxygen adsorption on the metal, indicating that adhesive wear dominated at RH sub max. R.J.F.

N85-13007*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

STIRLING MATERIAL TECHNOLOGY

R. H. Titran, J. R. Stephens, and C. M. Scheuermann 1984 22 p refs Presented at the 22nd Automotive Technol. Develop. Contractors' Conf. Coord. Meeting, Dearborn, Mich., 29 Oct. - 2 Nov. 1984; sponsored by the Society of Automotive Engineers

(Contract DE-AI01-77CS-51040)

(NASA-TM-86888; DOE/NASA/51040-57; E-2352; NAS 1.15:86888) Avail: NTIS HC A02/MF A01 CSCL 11F

The Stirling engine is an external combustion engine that offers the advantage of high fuel economy, low emissions, low noise, and low vibrations compared to current internal combustion automotive engines. The most critical component from a materials viewpoint is the heater head consisting of the cylinders, heating tubes, and regenerator housing. Materials requirements for the heater head include compatibility with hydrogen, resistance to hydrogen permeation, high temperature oxidation/corrosion resistance, and high temperature creep-rupture and fatigue properties. A materials research and technology program identified the wrought alloys CG-27 and 12RN72 and the cast alloys XF-818, NASAUT 4G-A1, and NASACC-1 as candidate replacements for the cobalt containing alloys used in current prototype engines. It is concluded that manufacture of the engine is feasible from low cost iron-base alloys rather than the cobalt alloys used in prototype engines. Results of research that lead to this conclusion are presented. R.S.F.

N85-13008*# National Aeronautics and Space Administration, Washington, D. C.

STRUCTURAL CHANGES DURING MILLING OF ALUMINUM OXIDE POWDERS

G. Ziepler Jul. 1984 15 p refs Transl. into ENGLISH from Keram. Z. (West Germany), v. 33, no. 10, 1981 p 602-605 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-77488; NAS 1.15:77488) Avail: NTIS HC A02/MF A01 CSCL 11F

The mechanical activation of four fused corundum powders and a calcined Al2O3 powder was studied. The milled powders were characterized by their structural properties, crystallite size, and lattice distortions. Structural changes during milling, detected by X-ray line broadening analysis, gave information about the enhanced activity of the powders caused by the lattice distortions and by the decreasing crystallite size during milling. The structural changes during milling, under the same milling conditions, can be quite different for the same ceramic material, but with different characteristics in the as received state. Author

N85-13009*# National Aeronautics and Space Administration, Washington, D. C.

THE ALPHA-FORM OF THE HYDROXIDES OF BIVALENT METALS

W. Feitknecht Aug. 1984 27 p refs Transl. into ENGLISH from Helv. Chim. Acta (Switzerland), v. 21, 1983 p 766-784 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-77508; NAS 1.15:77508) Avail: NTIS HC A03/MF A01 CSCL 22F

X-ray analyses were made of the hydroxides of the bivalent metals. The freshly pptd. hydroxide is usually in the alpha-form, which on standing is converted to another form or other forms. The alpha and c grating dimensions of the alpha-form and the C6-type of Co, Zn, C, Co-Zn and Ni-Zn hydroxides are tabulated. Ni hydroxide does not exhibit an alpha-form. The alpha-Co(OH)2, the blue form, is stabilized by sugar or by the higher alcohols: these compounds do not stabilize alpha-Zn(OH)2. Author

N85-13010*# National Aeronautics and Space Administration, Washington, D. C.

REACTIVE SINTERING OF SIC

Y. W. Kim and J. G. Lee Jun. 1984 19 p refs Transl. into ENGLISH from J. of the Korean Ceram. Soc. (South Korea), v. 20, no. 2, 1983 p 115-122 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
Avail: NTIS HC A02/MF A01 CSCL 11F

Investigation of the sintering processes involved in the sintering of SiC revealed a connection between the types and quantities of sintering additives or catalysts and densification, initial shrinkage, and weight loss of the sintered SiC material. By sintering processes, is meant the methods of mass transport, namely solid vapor transport and grain boundary diffusion. Author

N85-13011# Bendix Corp., Kansas City, Mo.

CVD PARAMETER STUDY USING STRATEGY OF EXPERIMENTATION

R. E. Williams Jul. 1984 35 p refs
(Contract DE-AC04-76DP-00613)
(DE84-015900; BDX-613-3090) Avail: NTIS HC A03/MF A01

An experimental design strategy was used to determine the operating characteristics of an apparatus for forming tungsten-rhenium (W-Re) alloys by chemical vapor deposition. The metal deposits were made at 650 C by the hydrogen reduction of a 10 percent rhenium hexafluoride and 90 percent gas mixture at 0.66 to 4.00 kPa (5 to 30 torr). Hydrogen flow rates ranged from 550 to 2770 (MU)mol/s and mixed metal fluoride flows ranged from 41 to 130 (MU) mol/s. An operating point was sought that would produce a high strength alloy, so the deposition results were fit by least squares regression to second order response equations. Seven properties were measured: deposition rate, average composition, maximum composition, minimum composition, sample standard deviation of the composition, microhardness as a measure of the amount of A15 phase, and as-deposited surface quality. A set of operating parameters was determined that was predicted to yield a 23 w/o Re alloy with an 1100 DPH (diamond pyramid hardness) microhardness. DOE

N85-13012# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Materials Engineering.

TESTS AND MODELING FOR SINTERING THEORY

R. H. Doremus and R. M. German 16 Dec. 1983 12 p refs
(Contract DE-AC02-82ER-12069)
(DE84-015110; DOE/ER-12069/T2) Avail: NTIS HC A02/MF A01

Powder fabrication, sintering studies and computer calculations are discussed. Fine alumina powders were fabricated by instantaneous isothermal dehydration. The sintering of these precipitated alumina powders was studied both isothermally and with a constant heating rate dilatometer. The initial observations on densification were interpreted as Coble creep, which is evidence for a dislocation mechanism in the sintering. Data supporting this mechanism included grain size by X-ray diffraction, shrinkage using dilatometry, bulk density measurements and specific surface area using gas absorption. The compacts were also examined in the electron microscope. The phase transformation of gamma to alpha alumina influences the rate of densification. The kinetic analysis indicates a dislocation aided diffusion process. The sintering of mixed phase (alpha plus gamma alumina) powders also supports the influence of plastic flow. DOE

N85-13013# Sandia Labs., Albuquerque, N. Mex.

TIME-RESOLVED SPECTROSCOPY OF EVANESCENT-WAVE EXCITED FLUORESCENCE

B. W. Dodson Aug. 1984 5 p refs Presented at SPIE Ann. Tech. Symp., San Diego, Calif., 19 Aug. 1984
(Contract DE-AC04-76DP-00789)
(DE84-015213; SAND-84-0389C; CONF-840872-2) Avail: NTIS HC A02/MF A01

An experimental proof of principle system for making time-resolved spectrographic measurements of laser-induced fluorescence in organics undergoing shock wave loading was developed. The source of excitation is a flashlamp-pump dye laser and the detector is a 0.2m spectrograph coupled to an Imacon 500 streak camera. The sample, in liquid solution, is excited in an evanescent-wave geometry, which results in only a very thin (approximately 1000A) layer of sample being excited. Excitation of such a thin layer is required to obtain high time resolution in samples undergoing shock wave loading, which is the intended application for this technique. Optical time resolution of 100 psec was achieved, and shorter time scales appear within easy reach. DOE

N85-13014# California Univ., Livermore. Lawrence Livermore Lab.

SUBGRAINS, DISLOCATIONS AND THE ELEVATED-TEMPERATURE STRENGTH OF TYPE 304 STAINLESS STEEL

M. E. Kassner and A. K. Miller 28 Sep. 1983 12 p refs Presented at Intern. Conf. on New Develop. in Stainless Steel Technol., Detroit, 16 Sep. 1984
(Contract W-7405-eng-48)
(DE84-001233; UCRL-89837; CONF-840909-1) Avail: NTIS HC A02/MF A01

The authors' previous investigations of the effects of dislocations and subgrains on the elevated temperature strength of Type 304 stainless steel are reviewed. Specifically, the separate roles of subgrains and forest dislocations on the elevated temperature isotropic component of the strength were quantified by a root mean square (rms) equation. The rms equation accurately predicts the isotopic strength over a wide range of temperature (750 to 1065(0)C). Over this temperature range, which includes both the power law (PL) and power law breakdown (PLB) creep regimes, forest dislocation strengthening appears dominating. The kinematic or back stress component of the strength was also studied. It was not found to be very strongly influenced by pronounced dislocation heterogeneities such as subgrain boundaries or cells.

In the PLB regime, unlike the PL regime, well defined subgrain boundaries are not stable and the steady state structure consists primarily of diffuse or cell like boundaries. This transition in subgrain boundary definition, however, is a manifestation of rather than a cause for PLB. DOE

N85-13015# California Univ., Berkeley. Lawrence Berkeley Lab.
CORROSION OF A ZINC ROTATING DISK IN ONE MOLAR HYDROCHLORIC ACID M.S. Thesis
Alan Hauser 20 Apr. 1984 229 p refs
(Contract DE-AC03-76SF-00098)
(DE84-015974; LBL-17461) Avail: NTIS HC A11/MF A01

The corrosion of a zinc rotating disk in one molar hydrochloric acid was studied by a potentiodynamic polarization method. Experimental rotating disk data at a rotation speed of 1600 rpm are presented. The polarization curves are analyzed to determine the transfer coefficients and rate constants for the anodic zinc dissolution and cathodic hydrogen evolution reactions. A modified Butler-Volmer equation is used to describe the kinetics of the zinc and hydrogen charge transfer reactions accounting for the forward and back terms of each reaction. Mass transfer of the electroactive and complexed zinc species is accounted for assuming that the homogeneous reactions are in equilibrium. When the modified Butler-Volmer equation is used, however, the cathodic polarization sweep away from the open circuit potential is significantly different from what was expected owing to the effect of the cathodic zinc reaction. Results of the model are compared to conventional polarization techniques which underestimate the corrosion current density. DOE

N85-13016# Ames Lab., Iowa.
DIRECTIONAL SOLIDIFICATION STUDIES OF Pb-Bi PERITECTIC ALLOYS Ph.D. Thesis - Iowa State Univ.
Bor-Ching Fuh 1 Aug. 1984 139 p refs
(Contract W-7405-eng-82)
(DE84-015656; IS-T-1152) Avail: NTIS HC A07/MF A01

Directional solidification experiments were carried out in the Pb-Bi peritectic alloys to study the (ALPHA) (YIELDS) (BETA) phase transition, primary spacing and band structure formation. DOE

N85-13017# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Materials Engineering.
LOCALIZED CORROSION AND STRESS CORROSION CRACKING BEHAVIOR OF STAINLESS STEEL WELDMENTS Annual Progress Report, 1 Jan. - 30 Nov. 1983
W. F. Savage and D. J. Duquette Jan. 1984 5 p
(Contract DE-AC02-76ER-02462)
(DE84-016095; DOE/ER-02462/10; COO-2462-10) Avail: NTIS HC A02/MF A01

The resistance of ferritic stainless steels to localized corrosion was examined as well as the effects of welding variables on second phase formation and subsequently on corrosion resistance. Activities to understand localized corrosion (including passive film formation and stability), stress corrosion cracking, and phase formation and stability (including heat treatment effects) are reported. DOE

N85-13018# North Carolina State Univ., Raleigh. Dept. of Materials Engineering.
EROSION OF MULTIPHASE MATERIALS
K. Anand, C. Morrison, R. Scattergood, H. Conrad, J. Routbort (Argonne National Lab., Ill.), and R. Warren (Chalmers Univ. of Technology) 1984 5 p refs Presented at the 2nd Intern. Conf. on the Sci. of Hard Mater., Rhodes, Greece, 23-28 Sep. 1984
(Contract W-31-109-eng-38)
(DE84-015816; CONF-8409117-1-ABST) Avail: NTIS HC A02/MF A01

A series of WC-Co alloys containing up to 25 wt % Co, and a fully aligned composite with continuous Al2O3 fibers in a 304 stainless steel matrix were studied. Erodent particles of Al2O3 abrasives were used. Erosion rate vs angle of impact and particle velocity was measured. DOE

N85-13019# California Univ., Livermore. Lawrence Livermore Lab.
THE Al-Be SYSTEM: THE EFFECTS OF RSP ON STRUCTURE AND PHASE RELATING
Lee E. Tanner, Loren A. Jacobson, Alan R. Pelton (Ames Lab., Iowa), Ron Gronsky (California Univ. Lawrence Berkeley Lab.), John H. Perepezko (Wisconsin Univ., Madison), Boyd A. Mueller (Wisconsin Univ., Madison), and Sidney S. Brenner (Pittsburgh Univ.) 16 Jul. 1984 5 p refs
(Contract W-7405-eng-48)
(DE84-015604; UCRL-91274; CONF-8409107-4) Avail: NTIS HC A02/MF A01

The development of microstructure is being studied as a function of high-rate solidification in Al alloys with 0.5 to 35 at. % Be. Processing methods include arc/hammer splatting, ribbon-spinning, electron beam surface melting, and the cooling of fine droplets. DOE

N85-13020# California Univ., Livermore. Lawrence Livermore Lab.
FORMATION OF SUBSURFACE Al2O3 LAYERS IN ALUMINUM BY OXYGEN ION IMPLANTATION
R. G. Musket, D. W. Brown, and H. C. Hayden 27 Jul. 1984 18 p refs Presented at the Ion Beam Modification of Mater. Conf., Ithaca, N.Y., 16 Jul. 1984 Submitted for publication
(Contract W-7405-eng-48)
(DE84-015599; UCRL-90479; CONF-840760-8) Avail: NTIS HC A02/MF A01

The use of high-dose oxygen ion implants to create buried, insulating SiO2 layers in silicon has been reported by many groups. In contrast, only a few groups have studied ion-implanted oxide layers on and in aluminum films. The formation of subsurface Al2O3 layers in bulk, polycrystalline aluminum were investigated. In particular, 1 to 16 x 10 to the 17th power atoms/sq cm were implanted using low current densities of 180 keV O2(+) near room temperature. Depth distributions of oxygen and aluminum were determined using both Auger-electron spectroscopy combined with argon-ion sputtering and helium-ion backscattering. For oxygen fluences greater than about 8 x 10 to the 17th power atoms/sq. cm, the analyses reveal subsurface layers of Al2O3 formed with thicknesses that increased with implanted dose. Results were combined with those from the aluminum literature to propose a formation process. DOE

N85-13021# Oak Ridge National Lab., Tenn. Solid State Div.
FORMATION OF SUPERCONDUCTIVE Al(GeSi) ALLOYS BY LOW TEMPERATURE LASER QUENCHING METHODS
J. R. Thompson, S. T. Sekula, D. H. Lowndes, and H. R. Khan (Forschunginstitut fuer Edelmetalle und Chemie) Mar. 1984 3 p refs Presented at 17th Intern. Conf. on Low Temperature Phys., Karlsruhe, West Germany, 15 Aug. 1984
(Contracts DE-AC05-84OR-21400; W-7405-eng-26)
(DE84-016667; CONF-840842-28) Avail: NTIS HC A02/MF A01

Metastable, superconductive alloys of Al have been formed by rapid quenching to cryogenic temperatures. Very large cooling rates (aprox. 10(9) K/s initially) followed irradiation with short bursts of UV light from an excimer laser. Immediate, in situ measurement of the superconductive transition temperature T/sub c/ revealed a maximum T/sub c/ of 6.4K in Al0.7 Ge0.3, 8.0K in Al0.7Ge0.15Si0.15, and metastability of the quenched layer. The changes in T/sub c/ are related to the laser energy density and compared with those observed in similar materials when processed by other rapid quenching methods. DOE

N85-13022# Hanford Engineering Development Lab., Richland, Wash.
EVALUATION OF FERRITIC ALLOY Fe-2 1/4Cr-1Mo AFTER NEUTRON IRRADIATION: IRRADIATION CREEP AND SWELLING
D. S. Gelles and R. J. Puigh May 1984 30 p refs Presented at the 12th Intern. Symp. on Effects of Radiation on Mater., Williamsburg, Va., 18-20 Jun. 1984
(Contract DE-AC06-76FF-02170)

(DE84-014647; HEDL-SA-3031-FP; CONF-840604-12) Avail: NTIS HC A03/MF A01

Irradiation creep and swellin measurements are reported for Fe-2 1/4Cr-1Mo after irradiation by fast neutrons over the temperature range 370 to 570(0) C. Diameter change measurements on thin walled pressurized tubes in a bainitic condition and density change measurements on rods in a nonstandard condition were made following irradiation in the Experimental Breeder Reactor 2. The irradiation creep specimens were irradiated to a fluence of 5.7 x 10 to the 22 power n/cm(2) (E greater than 0.1 MeV) or 30 dpa and the swelling specimens were irradiated to a peak fluence of 2.4 x 10 to the 23 power n/cm(2) or 115 dpa. These results were used as a basis to establish in-reactor creep and swelling correlations for 2 1/4Cr-1Mo in a bainitic condition. The correlation predict moderate swelling and moderate irradiation enhanced creep at 390(0) C to 480(0) C. The in-reactor creep data at 570(0) C indicates that thermal creep mechanisms become important at this irradiation temperature. DOE

N85-13023# Bendix Corp., Kansas City, Mo.

CONTAMINATION PROBLEMS DURING SURFACE CLEANING FOR THERMOCOMPRESSION BONDING

M. K. Raut and J. G. Vaughan (Mississippi Univ.) Jun. 1984 25 p refs Presented at the 12th DOE Surface Studies Conf., Oak Ridge, Tenn., 11 Jun. 1984
(Contract DE-AC04-76DP-00613)
(DE84-013066; BDX-613-3069; CONF-840617-2) Avail: NTIS HC A02/MF A01

Chromium/evaporated gold titanium/palladium/electroplated gold thin-film hybrid microcircuits experienced delamination problems during the thermocompression bonding of beam-leaded semiconductors and ribbon crossovers. The surface analysis showed that hydrogen peroxide cleaning of the microcircuits deposited tin on the gold bond pads. The bonding problem was believed to result from tin contamination on the surface. Further evaluations showed that only the ribbon crossover bonds were affected by the tin contamination and that the delaminations of the beam-leaded devices were caused by carbon contamination. Improved alternative surface cleaning methods were evaluated and implemented for both the beam-lead devices and the thin film microcircuits. DOE

N85-13024# Argonne National Lab., Ill.

CERIUM COMPOUNDS IN THE FASHION OF THE LIGHT ACTINIDES

D. D. Koelling 3 Sep. 1984 9 p refs Presented at EPS Topical Conf. on Electron. Structure and Properties of Rare Earth and Actinide Intermetallics, St. Polten, Austria, 3 Sep. 1984
(Contract W-31-109-eng-38)
(DE84-014642; CONF-8409102-3) Avail: NTIS HC A02/MF A01

Cerium compounds a microcosm of the rich variety of properties, seen in the light actinides are discussed. The parallelism seen between comparable cerium and actinide compounds suggests that the same physical models are applicable. The most significant is the relative size of the f orbital. Localization is generally tighter in Ce compounds than uranium compounds, making Ce roughly analogous to Np through Am. A way to see the actinide parallelism is to compare Hill plots. Compounds in the different regions of the plots are isostructural compounds with the same companion (B) elements. The most common materials exhibiting a direct f-f interaction are the cubic Laves compounds. The band structures of CeRu2, CeRh2, CeIr2, CeOs2, and CeNi2 was determined. Compounds illustrative of the interaction of f-orbitals with ligand orbitals are the Cu3Au structured materials. Materials calculated in this class are CeRh3, CePd3, and CeSn3, the materials of much interest as mixed valent. DOE

N85-13025# Delaware Univ., Newark.

RADIATION EFFECTS IN AMORPHOUS METALLIC ALLOYS Final Report

Richard B. Murray, David G. Onn, and John J. Kramer Jun. 1984 60 p refs
(Contract DE-AC02-80ER-10571)
(DE84-014302; DOE/ER-10571/10) Avail: NTIS HC A04/MF A01

Members of the series Fe/sub x/Ni/sub 80x/P/sub y/B/sub 20-y/ (20 less than or equal to x less than or equal to 40; 0 less than or equal to y less than or equal to 14) alloys were prepared as ribbons on a melt spinner. Irradiations were performed with electrons, protons, deuterons and alpha particles at 0.25 to 2.25 MeV. Curie temperature, small-angle X-ray scattering intensity, recrystallization kinetics, low-temperature electrical resistivity, magnetic domain structure, composition of the ribbon and near-surface region were measured by TEM, RHEED, and Auger studies. Surface profiles were measured by Rutherford backscattering. Ion implantation effects are reported. Results show that the effects of irradiation with these light particles are very similar to those of thermal annealing, viz. structural relaxation to an amorphous state of lower energy than that achieved upon rapid freezing. Irradiation effects are interpreted qualitatively in terms of transient heating around the path of a projectile; direct atomic collisions apparently play a minor role. DOE

N85-13026# Oak Ridge National Lab., Tenn. Metals and Ceramics Dept.

ELECTROCHEMICAL PITTING EVALUATION OF ALUMINUM ALLOY 7075 IN MACHINING COOLANT

V. A. Stanaland and J. J. Dillon 24 Aug. 1984 14 p
(Contract DE-AC05-84OR-21400)
(DE84-016844; Y/DV-371) Avail: NTIS HC A02/MF A01

The corrosion rate of aluminum alloy 7075 in Trim Sol with a Tris-Nitro biocide addition which is satisfactory is outlined. Both deaeration and increase of nitrite addition decreased the stability of the passive film. Chloride contamination below 500 ppM does not cause pitting corrosion of aluminum alloy 7075 in the Trim Sol environment. The limit for chloride contamination is between 500 and 1000 ppM. The potentiodynamic, fast scan rate technique is satisfactory for evaluating the pitting tendency of the aluminum alloy 7075 in a Trim Sol environment. The potentiodynamic, fast scan rate technique is recommended for use in conjunction with reverse scans to evaluate the quality of in use machining coolants, that are suspected of causing contamination. DOE

N85-13027# Pennsylvania State Univ., University Park.

STRUCTURAL PROPERTIES OF AMORPHOUS METALS BY RAMAN SCATTERING Final Progress Report

J. S. Lannin Aug. 1984 6 p
(Contract DE-AC02-82ER-12083)
(DE84-016947; DOE/ER-12083/2) Avail: NTIS HC A02/MF A01

Optical and vibrational properties of amorphous transition metal/metalloid alloys were studied for structure, bonding and electronic states in amorphous metals. Optical measurements were obtained on dc sputtered amorphous Fe/sub 1-x/B sub x/ alloys that provide basic parameters for trilayer Raman studies and indicate the transition from amorphous semiconductors to semimetal to metal with increasing Fe concentration. Trilayer Raman scattering measurements at xx = 0.2, where the system is weakly metallic, indicated significant changes in the amorphous B-spectra due to important Fe-B interactions. Complementary inelastic neutron scattering measurements at the Argonne IPNS facility provided the first information on the detailed vibrational states of the glassy metal system Fe 78P 22 and its crystalline counterpart Fe3P. The strength of transition metal transition metal and metalloid transition metal interactions which is of importance for structural and dynamical theories of amorphous metals is outlined. DOE

N85-13028# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.

THE DISORDERING PROCESS IN AN L1SUB2 ORDERED ALLOY

J. A. Horton, A. DasGupta, and C. T. Liu 1984 3 p Presented at the 42nd Ann. Electron Microscopy Society of America Meeting, Detroit, 13 Aug. 1984
(Contract DE-AC05-84OR-21400)
(DE84-016599; CONF-840848-5) Avail: NTIS HC A02/MF A01

Ordered intermetallic alloys potentially which have good high temperature mechanical properties which often are obtained by macroalloying are examined. Since service temperatures may be near the critical ordering temperature, T/sub c/, it is important to understand the disordering processes. The disordering mechanism in an alloy of 52.5 at.% Ni-22.5 Fe-14.5 V-10 Al-0.5 Ti [which can be expressed as (Ni70Fe30)3(V58A140Ti2)], is presented. The aluminum was added to increase T/sub c/ from 750 to 975(0)C and to stabilize the L12 structure. DOE

N85-13029# Oak Ridge National Lab., Tenn.
SOLIDIFICATION AND AGING BEHAVIOR OF TYPES 308 AND 308CRE STAINLESS STEEL WELDS
J. M. Vitek, S. A. David, W. H. Smith, and R. W. Reed Aug. 1984 29 p refs
(Contract DE-AC05-84OR-21400)
(DE84-016552; ORNL/TM-9086) Avail: NTIS HC A03/MF A01

Controlled residual element (CRE) additions of Ti, P, and B to type 308 stainless steel filler metal were previously improved the elevated-temperature creep-rupture properties of welds. The solidification and aging behavior of types 308 and 308CRE stainless steel welds were examined in an effort to identify the mechanism responsible for the improved mechanical properties. Extensive aging studies at 550 C to 850 C for times up to 10,000 h revealed significant differences. The transformation of ferrite in the as-welded duplex structure to sigma phase was not retarded by CRE additions. However, the extensive precipitation of M23C6 at the austenite-ferrite interfaces in the aged type 308 stainless steel welds was replaced by more homogeneous precipitation of titanium-rich carbides, nitrides, and sulfides in aged type 308CRE stainless steel. Results are summarized in the form of time-temperature-transformation diagrams. DOE

N85-13030# Sandia Labs., Albuquerque, N. Mex.
STORAGE LIFE OF THERMAL DETENTS
F. G. Yost and A. D. Romig, Jr. Aug. 1984 26 p refs
(Contract DE-AC04-76DP-00789)
(DE84-016934; SAND-84-0678) Avail: NTIS HC A03/MF A01

A thermal detent is an irreversible locking mechanism which is activated upon reaching a critical temperature. The locking occurs when two or more parts joined by a fusible alloy separate after heating the fusible alloy to a temperature at which it begins melting and can no longer support an applied shear stress. The formation of high melting point intermetallic compounds in the fusible alloy joint can lead to failure. The kinetics of intermetallic compound growth are measured and modeled to provide estimates of lifetime to failure as a function of time, temperature and joint geometry. It is found that the useful life of thermal detents can be predicted if the initial geometry of the fusible alloy joint can be determined. DOE

N85-13031# Ames Lab., Iowa.
PREPARATION OF LOW-SILICON VANADIUM METAL
O. N. Carlson and F. A. Schmidt 1984 10 p refs Presented at the Vaccum Metallurgy Conf. on Speciality Metals Melting and Processing, 11-13 Jun. 1984 Sponsored in part by the Office of Basic Energy Sciences.
(Contract W-7405-eng-82)
(DE84-014818; IS-M-513) Avail: NTIS HC A02/MF A01

A modified method for preparing high purity vanadium metal by the aluminothermic reduction of V2O5 oxide in a water-cooled copper crucible is described. Experiments designed to prepare low-silicon vanadium directly from commercial grade V2O5 show promise of simplifying the process for producing this material on a commercial scale. A vanadium-oxygen alloy is first prepared and then double electron-beam melted into platelet form during which 810 is removed by volatilization. Residual oxygen is removed from the platelets by a calcium deoxidation procedure. Experiments in which V2O5 is added to commercial vanadium metal to lower its silicon content by similar processing are also described. Silicon in amounts up to 1000 wt ppM was found to have a rather small effect on the hardness, yield and tensile strength and ductility of vanadium. DOE

N85-13032# Aarhus Univ. (Denmark). Inst. of Physics.
INTERACTION OF HYDROGEN WITH DEFECTS IN METALS
F. Besenbacher, S. M. Myers (Sandia Labs, Albuquerque, N. Mex.), and J. K. Noerskov (NORDITA, Copenhagen) 1984 39 p refs Presented at the Ion Beam Modification of Mater. Conf., Ithaca, N.Y., 16 Jul. 1984
(Contract DE-AC04-76DP-00789)
(DE84-016781; SAND-84-1708C; CONF-840760-11) Avail: NTIS HC A03/MF A01

The interaction of hydrogen with defects in metals is reviewed, with the major emphasis on ion-implantation studies. Experimental results for trap binding enthalpies of hydrogen to defects (such as vacancies, interstitials, dislocations, and bubbles/voids) are discussed, as is the lattice location of hydrogen trapped to these defects (mainly vacancies) obtained by the channeling technique. The experimental results are compared with theoretical predictions based on the effective-medium theory. It will be shown how an interplay between theory and experiment has recently enhanced our understanding of these hydrogen-defect interactions. DOE

N85-13033# Argonne National Lab., Ill. Materials Science and Technology Program.
EFFECTS OF MONOLAYER CONVERAGES ON SUBSTRATE SPUTTERING YIELDS
D. M. Gruen, A. R. Krauss, and M. J. Pellin 1984 28 p refs Presented at a Workshop on Synergistic Effects in Surface Phenomena Related to Plasma-Wall Interactions, Nagoya, Japan, 21-23 May 1984
(Contract W-31-109-eng-38)
(DE84-016312; CONF-840534-1) Avail: NTIS HC A03/MF A01

Materials which are currently used or considered for plasma side applications are not entirely satisfactory, particularly in the medium edge temperature regime. A new approach to impurity control based on self sustaining surface segregated low-Z layers with high secondary ion fractions was tested. Reduction of substrate sputtering yields about an order of magnitude by monolayer adsorbate coverages is required. It is found that overlayer coverages result in profound reductions of substrate sputtering yields. It is concluded that a material such as a dilute alloy of Li in Cu could function as a limiter or a divertor plate material is based on the fact that more than 85% of the sputtered flux originates in the first atomic layer of the target. DOE

N85-13034# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
RESEARCH APPROACHES TO QUALIFY ALUMINUM FOR OCEAN THERMAL ENERGY CONVERSION (OTEC) SYSTEMS
Patrick Russell, Steven Pohlman, and Gordon Gross Jun. 1984 16 p
(Contracts DE-AC02-83CH-10093; EG-77-C-01-4042)
(DE84-013007; SERI/TR-255-1599) Avail: NTIS HC A02/MF A01

The efforts of the Solar Energy Research Institute's Material Research Branch in the technical support of Ocean Thermal Energy Conversion (OTEC) power systems are summarized. The results of an intense literature search are presented and the test loops being operated in support OTEC are discussed. The preliminary findings of electrochemical experimentation are included. An approach to addressing those areas of continued concern is offered. R.S.F.

N85-13035# Monsanto Research Corp., Miamisburg, Ohio.
THERMAL CONDUCTIVITY OF IRON/POTASSIUM PERCHLORATE HEAT POWDER
Calvin M. Love, Don E. Etter, and Jerome E. Glaub 6 Sep. 1984 20 p refs
(Contract DE-AC04-76DP-00053)
(DE84-017071; MLM-3173) Avail: NTIS HC A02/MF A01

The thermal conductivity of unburned and burned Fe/KCl04 heat powder pellets, of two different weight ratios, was determined as a function of pellet density and temperature. Thermal diffusivities as a function of temperature were measured by a laser flash diffusivity method and these data were combined with density and specific heat data to obtain the thermal conductivity results. The thermal conductivity of unburned 88/12 Fe/KC104 is about 25% higher than that of unburned 84/16 Fe/KC104; the thermal conductivity of unburned Fe/KC104 of both ratios about doubles on going from 50 to 70% of theoretical density. The thermal conductivity of burned 88/12Fe/KC104 is likewise significantly higher than that of burned 84/16 Fe/KC104. In general, the thermal conductivity of both 84/16 and 88/12 burned Fe/KC104 decreases slightly with increasing temperatures and increases with increasing density. DOE

N85-13036# Leitz (Ernst) G.m.b.H., Wetzlar (West Germany). Ressort Entwicklung.
ION CONTRASTING CHAMBER FOR DISCRIMINATION OF GRAINS AND TEXTURES Final Report, Dec. 1980
Dierick Kossel Bonn Bundesministerium fuer Forschung und Technologie Jul. 1984 49 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-84-151; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 10.50

For the discrimination of grains and textures under microscopic examination, a method to contrast alloys and compounds by weakly-absorbing interference layers was developed. For the deposition of the layers a sputtering technique was used. A minimal set of layers (lead oxide, iron oxide, platinum oxide) allows the effective contrasting of metallographic textures. The optical constants of weakly-absorbing layers being unsteady the method is not suitable for the determination of ns and ks values of the substrate phase. Author (ESA)

N85-13037# Centre Technique des Industries Mecaniques, Senlis (France).
CORROSION OF BRASS IN POTABLE WATER SERVICE Final Report [CORROSIONS DES LAITONS DE ROBINETTERIE]
M. A. Laroche and B. Sutter Sep. 1983 22 p refs In FRENCH
(CETIM-100390) Avail: NTIS HC A02/MF A01

Dezincification and stress corrosion of water pipes are discussed. Loss of zinc is reduced by using one phase brass with addition of arsenic, antimony or phosphorus. Corrosion resistance dependance on chemical composition is discussed. Corrosion tests are reviewed. Ways to reduce corrosion are examined. Author (ESA)

N85-13038# Deutsche Gesellschaft fuer Chemisches Apparatewesen (Dechema), Frankfurt am Main (West Germany).
INTERACTIONS BETWEEN CORROSION AND CREEP OF UNCOATED AND COATED SUPERALLOYS IN SULFATE MELTS European Concerted Action: COST 50 - Materials for Gas Turbines, Project 3-D2. Final Report
W. T. Wu, A. Rahmel, and M. Schorr 1983 40 p refs
Avail: NTIS HC A03/MF A01

Electrochemical corrosion measurements with Pt-containing (LDC-2) and Pt-free Al-diffusion coatings in the $(Na, K)_2 SO_4$ melt at 1173 K are summarized. The Pt-containing coating type exhibits a broader passive range than the Pt-free type. The Pt-free type corrodes significantly faster in the passive range than the Pt-containing type. The breakthrough potential for acidic fluxing is similar for both types. The Pt-containing type has a significantly higher resistance to basic fluxing. The breakthrough potential is 300 mV more negative than that of the Pt-free type. Creep tests with IN 939 in the $(Na_2, Mg, Ca) SO_4$ melt under potentiostatic control at 1073 K show that potential affects creep behavior, due to a reduction of the load bearing cross section due to corrosion. Author (ESA)

N85-13039# Vacuumschmelze G.m.b.H., Hanau (West Germany). Entwicklungsabteilung.
DEVELOPMENT OF RAPIDLY QUENCHED ALLOYS WITH SPECIAL PHYSICAL PROPERTIES AND OF PROCESSES FOR THEIR CONTINUOUS PRODUCTION Final Report, Dec. 1982
Stefan Hock and Rainer Hilzinger Bonn Bundesministerium fuer Forschung und Technologie Sep. 1984 184 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-84-179; ISSN-0340-7608) Avail: NTIS HC A09/MF A01; Fachinformationszentrum Karlsruhe, West Germany DM 35

The influence of the process parameters for continuous casting techniques used to produce thin metal strips directly from the melt was evaluated. Routine production of amorphous strips with constant geometrical quality and reproducible properties was established. Processes used to coil the strips during casting are discussed. The mechanical properties of amorphous Ni-based alloys are presented as a function of alloy composition and subsequent treatment. Techniques for joining and subsequent manufacturing of amorphous alloys are pointed out. Author (ESA)

N85-13040# Bureau of Mines, Avondale, Md.
CORROSION RESISTANCE OF NITRIDED LOW-ALLOY STEELS
J. V. Scalera 1984 27 p refs
(PB84-235027; BM-RI8894; LC-84-600995) Avail: NTIS HC A03/MF A01 CSCL 11F

Because of U.S. dependency on imported critical metals, the Bureau of Mines conducted research to evaluate the possible substitution of nitrided low alloy steels for higher chromium containing alloys. The corrosion data for nitrided steels are limited primarily to the Soviet literature. The objective of this study was to determine the corrosion properties of six commercially nitrided low alloy steels in a 5-wt % NaCl solution at pH 4. Weight loss tests indicated that, in deaerated test solutions, most of the nitrided steels were less corrosion resistant than nontreated steels. However, electrochemical tests indicated that under more oxidizing conditions, nitrided materials are converted to a passive state with a significantly reduced corrosion rate. Electrochemical tests performed in an aerated environment confirmed the passivity of the samples in an oxidizing environment. Author (GRA)

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N85-13041 National Physical Lab., Teddington (England). Div. of Materials Applications.
PREDICTION OF LONG TERM STRENGTH OF GLASS REINFORCED PLASTICS IN WET ENVIRONMENTS
J. Aveston and J. M. Sillwood Sep. 1984 24 p refs
(NPL-DMA(A)-80; ISSN-0143-7313) Copyright. Avail: Issuing Activity

The combined effect of sustained load and aggressive environment in predicting the long term strength of glass reinforced plastics (GRP) is considered. The fundamental strength/time relationship is obtained using thin impregnated strands, which reach rapid equilibrium with the environment, i.e., water. These data are combined with diffusion data for a similar system to obtain an expression for the long term wet strength of bulk GRP. Author (ESA)

N85-13042# Committee on Agriculture (U. S. House).
GUAYULE RESEARCH
Washington GPO 1984 179 p Joint hearing before the Subcomm. on Sci., Res. and Technol. of the Comm. on Sci. and Technol. and the Subcomm. on Dept. Operations, Res., and Foreign Agr. of the Comm. on Agr., 98th Congr., 1st Sess., No. 97, 24 Mar. 1983
(GPO-29-562) Avail: Subcommittee on Science, Research and Technology

The proceedings are presented of a joint hearing before the House Subcommittee on Science, Research and Technology and the Subcommittee on Department Operations, Research, and

Foreign Agriculture regarding the extension of the Native Latex Commercialization and Economic Development Act of 1978. The purpose of that act was to attempt to bring to commercial production the Guayule plant which produces natural rubber. R.S.F.

N85-13043*# Springborn Labs., Inc., Enfield, Conn.

DEVELOPMENT OF ACCEPTANCE CRITERIA FOR BATCHES OF SILANE PRIMER FOR EXTERNAL TANK THERMAL PROTECTION SYSTEM BONDING APPLICATIONS Monthly Progress Reports, 1 Aug. - 31 Oct. 1984

F. Mikes 2 Dec. 1984 89 p
(Contract NAS8-35818)
(NASA-CR-171266; NAS 1.26:171266; MPR-7; MPR-8) Avail: NTIS HC A05/MF A01 CSCL 11B

Silane primers for use as thermal protection on external tanks were subjected to various analytic techniques to determine the most effective testing method for silane lot evaluation. The analytic methods included high performance liquid chromatography, gas chromatography, thermogravimetry (TGA), and fourier transform infrared spectroscopy (FTIR). It is suggested that FTIR be used as the method for silane lot evaluation. Chromatograms, TGA profiles, bar graphs showing IR absorbances, and FTIR spectra are presented. R.S.F.

N85-13044*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

EFFECT OF BARRIER HEIGHT ON FRICTION BEHAVIOR OF THE SEMICONDUCTORS SILICON AND GALLIUM ARSENIDE IN CONTACT WITH PURE METALS

Hiroshi Mishina (Inst. of Physical and Chemical Research, Saitama, Japan) and Donald H. Buckley Dec. 1984 12 p refs
(NASA-TP-2405; E-2219; NAS 1.60:2405) Avail: NTIS HC A02/MF A01 CSCL 11B

Friction experiments were conducted for the semiconductors silicon and gallium arsenide in contact with pure metals. Polycrystalline titanium, tantalum, nickel, palladium, and platinum were made to contact a single crystal silicon (111) surface. Indium, nickel, copper, and silver were made to contact a single crystal gallium arsenide (100) surface. Sliding was conducted both in room air and in a vacuum of 10 to the minus 9th power torr. The friction of semiconductors in contact with metals depended on a Schottky barrier height formed at the metal semiconductor interface. Metals with a higher barrier height on semiconductors gave lower friction. The effect of the barrier height on friction behavior for argon sputtered cleaned surfaces in vacuum was more specific than that for the surfaces containing films in room air. With a silicon surface sliding on titanium, many silicon particles back transferred. In contrast, a large quantity of indium transferred to the gallium arsenide surface. R.J.F.

N85-13045*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

HIGH-TEMPERATURE EROSION OF PLASMA-SPRAYED, YTTRIA-STABILIZED ZIRCONIA IN A SIMULATED TURBINE ENVIRONMENT

Robert F. Hanschuh Dec. 1984 19 p refs Prepared in cooperation with Army Research and Technology Labs., Cleveland
(NASA-TP-2406; E-2271; NAS 1.60:2406; AVSCOM-TR-84-C-17) Avail: NTIS HC A02/MF A01 CSCL 11B

A series of rig calibration and high temperature tests simulating gas path seal erosion in turbine engines were performed at three impingement angles and at three downstream locations. Plasma sprayed, yttria stablized zirconia specimens were tested. Steady state erosion curves presented for 19 test specimens indicate a brittle type of material erosion despite scanning electron microscopy evidence of plastic deformation. Steady state erosion results were not sensitive to downstream location but were sensitive to impingement angle. At difference downstream locations specimen surface temperature varied from 1250 to 1600 C (2280 to 2900 F) and particle velocity varied from 260 to 320 m/s (850 to 1050 ft/s). The mass ratio of combustion products to erosive grit material was typically 240. Author

N85-13046*# General Electric Co., Schenectady, N. Y. Corporate Research and Development Center.

TOUGHENING MECHANISM IN ELASTOMER-MODIFIED EPOXY RESINS, PART 2 Final Report, 1 Jul. 1982 - 30 Aug. 1983

A. F. Yee and R. A. Pearson Washington NASA Dec. 1984 56 p refs
(Contract NAS1-16132)
(NASA-CR-3852; NAS 1.26:3852; Rept-84-SRD-041) Avail: NTIS HC A04/MF A01 CSCL 11B

The role of matrix ductility on the toughenability and toughening mechanism of elastomer-modified DGEBRA epoxies was investigated. Matrix ductility was varied by using epoxide resins of varying epoxide monomer molecular weights. These epoxide resins were cured using 4,4' diaminodiphenyl sulfone (DDS) and, in some cases, modified with 10% HYCAR(r)CTBN 1300X8. Fracture roughness values for the neat epoxies were found to be almost independent on the monomer molecular weight of the epoxide resin used. However, it was found that the fracture toughness of the elastomer-modified epoxies was very dependent upon the epoxide monomer molecular weight. Tensile dilatometry indicated that the toughening mechanism, when present, is similar to the mechanisms found for the piperidine cured epoxies in Part 1. SEM and OM corroborate this finding. Dynamic mechanical studies were conducted to shed light on the toughenability of the epoxies. The time-dependent small strain behavior of these epoxies were separated into their bulk and shear components. The bulk component is related to brittle fracture, whereas the shear component is related to yielding. It can be shown that the rates of shear and bulk strain energy buildup for a given stress are uniquely determined by the values of Poisson's ratio, nu. It was found that nu increases as the monomer molecular weight of the epoxide resin used increases. This increase in nu can be associated with the low temperature beta relaxation. The effect of increasing cross-link density is to shift the beta relaxation to higher temperatures and to decrease the magnitude of the beta relaxation. Thus, increasing cross-link density decreases nu and increases the tendency towards brittle fracture. Author

N85-13047*# National Aeronautics and Space Administration, Washington, D. C.

ZETA POTENTIAL IN CERAMIC INDUSTRY

M. Lecuit Jul. 1984 42 p Transl. into ENGLISH from Bull. de la Soc. Franc. Ceram. (France), v. 116, 1977 p 19-37 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-77478; NAS 1.15:77478) Avail: NTIS HC A03/MF A01 CSCL 11B

Deflocculation, electrical conductivity and zeta potential (ZP) are studied for the addition of 0 to 10000 ppm Na2SiO3 deflocculator to slips obtained from three argillaceous materials (kaolin d'Arvor, ball clay Hyplas 64, and/or Granger Clay No. 10). The quantity of Na2SO3 required to deflocculate a slip is independent of the density but differes for each clay. The ZP is directly related to the density of the slip. The higher the ZP the more stable a slip is; the value of the ZP of a mixture does not follow a simple law but the electrical resistance of a mixture does follow a simple additive law. The ZP appears to have linear relation with the specific surface of the argillaceous material. M.G.

N85-13048*# National Aeronautics and Space Administration, Washington, D. C.

STUDY OF THE PORE STRUCTURE OF CERAMICS PREPARED BY THE SLIP CASTING METHOD

I. Ya. Guzman and A. V. Dobysh Jul. 1984 7 p refs Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-77495; NAS 1.15:77495) Avail: NTIS HC A02/MF A01 CSCL 11B

The porosity of the slip cast Si3N4 is similar to that of pressed Si3N4 formed at 2500 kg/sq cm. The porosity of cast Si oxynitride is equivalent to that of samples stressed at 10,000 kg/sq cm. Crucibles formed from these materials by slip casting have high thermal shock and corrosion resistance. Author

N85-13049# Avions Marcel Dassault-Breguet Aviation, Saint-Cloud (France). Lab. des Techniques Nouvelles.
POLYIMIDE RESIN CHARACTERISTICS, TEST Final Report [ESSAI 17.202: CARACTERISATION DE RESINE POLYIMIDE]
H. Mayer 30 Jan. 1984 35 p In FRENCH
(DGT-24.322; Rept-17.202) Avail: NTIS HC A03/MF A01

The physical, chemical, and mechanical properties of polyimide preimpregnated carbon fiber molded bodies were studied in order to assess the convenience of substitution of epoxy resin preimpregnated materials. The study includes viscoelastic analysis of the polymerization cycle, molding procedures and mechanical properties measurement. An improvement is found in hot environments after aging, but the advantages do not justify the substitution of the epoxy resins. Author (ESA)

N85-13050# Los Alamos Scientific Lab., N. Mex.
CERAMIC/CERAMIC SEALS BY MICROWAVE HEATING
T. T. Meek and R. D. Blake 1984 15 p refs Presented at the 14th European Microwave Conf., Liege, 10 Sep. 1984
(Contract W-7405-eng-36)
(DE84-007486; LA-UR-84-541; CONF-840944-1) Avail: NTIS HC A02/MF A01

Several conclusions may be drawn. First, less energy is required to form a glass-ceramic seal by microwave heating than by conventional heating. Second, less time is required to form the seal by microwave heating, and third, the seal composition is different, and the bonding is different. The microstructure of the seal formed by microwave heating reflects extensive diffusion of the glass constitients throughout the alumina substrate; and alumina throughout the seal glassy matrix. Fourth, higher heating rates are possible with microwave heating than with conventional heating. Last, the energy is coupled differently to the reactants using microwave heating, and thus the reaction kinetics may be different, as indicated by the vastly different microstructures obtained. DOE

N85-13051# Argonne National Lab., Ill. Materials Science and Technology Div.
EXAFS STUDIES OF SODIUM SILICATE GLASSES CONTAINING DISSOLVED ACTINIDES
G. S. Knapp, B. W. Veal, A. P. Paulikas, A. W. Mitchell, D. J. Lam, and T. E. Klippert Jul. 1984 4 p refs Presented at the 3rd Intern. EXAFS Conf., Stanford, Calif., 16-20 Jul. 984
(Contract W-31-109-eng-38)
(DE84-015835; CONF-840764-3) Avail: NTIS HC A02/MF A01

Sodium silicate glasses containing dissolved Th, U, Np, and Pu were studied using the extended x-ray absorpiton fine structure (EXAFS) technique. Th(4+), U(4+), Np(4+), and Pu(4+) ions in the silicate glasses are 8-fold coordinated to oxygen neighbors. The higher valent U(6+) and Np(5+) ions have complex local symmetries. The U(6+) ions appear in a uranyl configuration with 2 oxygen atoms at 1.85A and 4 at 2.25A from the U ion. The Np(5+) local symmetry is more complex and difficult to determine uniquely. The U(6+) glasses show substantial clustering of the uranium atoms. A structural model, with nearly planar uranyl sheets sandwiched between alkali and silica layers, is used to explain the U(6+) EXAFS data. This model allows us to understand why U(6+) ions are much more soluble in the glasses than the actinide 4(+) ions. DOE

N85-13052# Columbia Univ., New York. Dept. of Physics and Astronomy.
PHOTOCONDUCTIVITY AND EMISSION FROM THE IMPURITY EXCITED STATES IN SILICON Progress Report, 1 Dec. 1983 - 30 Nov. 1984
H. R. Chandraskhar Jul. 1984 13 p refs
(Contract DE-AC02-84ER-45048)
(DE84-015563; DOE/ER-45048/1) Avail: NTIS HC A02/MF A01

The impurity excited states in silicon were investigated. The impurity excited states are selectively populated by an in-situ lead salt laser, and simultaneously probed by means of photoconductive spectroscopy. Both the laser and the probe radiation were coupled to the sample via a beam-splitter and light pipe arrangement. The effects due to either beams is monitored by chopping the laser and the probe beam at different frequencies and tuning the phase-sensitive electronics to the appropriate frequency. A careful study of the laser tuning characteristics and the beam-splitter response is made. High quality samples of different impurities are fabricated. Several new and interesting features were observed: photo response that is present only when the laser is turned to frequencies which are characteristic of the impurity, low frequency photo-response which may be related to the formation of positive acceptor centers (A+) below 2 K: effects due to resonant interactions between localized phonons and the electronic continuum states of the impurity; and electric field induced photoconductivity peaks. DOE

N85-13053# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
SURFACE DIFFUSION OF HIGH TEMPERATURE VAPORS IN POROUS ALUMINA M.S. Thesis
Elizabeth J. Opila Nov. 1983 80 p refs
(Contract DE-AC03-76SF-00098)
(DE84-015968; LBL-16735) Avail: NTIS HC A05/MF A01

The purpose of this study was to determine whether surface diffusion contributed significantly to the transport of zinc vapor through porous aluminas of 0.6 micro m and 0.07 micro m average pore radii. Zinc, and zinc sulfide solids were vaporized into vacuum from a boron nitride cell covered with a porous alumina barrier. Zinc vapor fluxes through the barrier were determined using a weight loss technique. The flux of helium through the alumina was also determined from the leak rate at room temperature. After correction for molecular weight differences, any flux of zinc greater than that of helium was attributed to surface diffusion. In all experiments, Knudsen flow was operative in the gas phase. The ratio of surface flux to Knudsen flux for Zn sub (q) from Zn sub (s) in alumina of 0.6 micro m average pore size at 647K was 2.5. It was found that using alumina of 0.07 micro m average pore radius under the same experimental conditions increased the surface to Knudsen flux ratio to 17. This increase was proportional to the inverse of the average pore radius as predicted. In both cases, the amount of zinc vapor transmitted and the ratio of surface to Knudsen flux for zinc was the same. DOE

N85-13054# Argonne National Lab., Ill. Chemical Technology Div.
MATERIALS FOR HIGH-TEMPERATURE FUEL CELLS
J. P. Ackerman and T. D. Claar Jul. 1984 8 p refs Presented at the Mater. for Future Energy Systems Conf., Washington, D.C., 1-3 May 1984
(Contract W-31-109-eng-38)
(DE84-016316; CONF-840570-11) Avail: NTIS HC A02/MF A01

The design and operation of advanced high-temperature fuel cells are described. The functional requirements of the various cell components are reviewed, and the basis of selection of cell materials and fabrication processes is presented. The possible directions that fuel cell materials research and development will take during the next 20 years are discussed. DOE

N85-13055# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
CERAMIC TECHNOLOGY FOR ADVANCED HEAT ENGINES PROGRAM PLAN
Jun. 1984 85 p refs
(Contract DE-AC05-84OR-21400)
(DE84-013567; ORNL/TM-8896) Avail: NTIS HC A05/MF A01

A plan for a generic ceramic research effort that supports and parallels existing advanced heat engine programs is presented. This long-range plan is to identify technology base needs; coordinate activities with other industry, government, and university programs; and develop a multiyear technical and resource agenda. DOE

N85-13056# BDM Corp., Albuquerque, N. Mex.
THERMAL CONDUCTIVITY AND INTERFACE RESISTANCE OF PARTICLE-FILLED SILICONE RESIN
W. E. Schwinkendorf and M. Moss (Sandia Labs, Albuquerque, N.

Mex.) 1984 8 p refs Presented at the 22nd Natl. Heat Transfer Conf., Niagara Falls, N.Y., 5 Aug. 1984
(Contract DE-AC04-76DP-00789)
(DE84-011681; SAND-83-2375C; CONF-840816-10) Avail: NTIS HC A02/MF A01

The thermal conductivity of silicone resin containing various amounts of Al2O3, MgO, BN and copper particles was measured with a Colora thermoconductometer. Samples consisted of aluminum and alumina discs bonded with unfilled or particle filled resin. Most particle loaded samples displayed a conductivity that declined with decreasing bond thickness which is due to a measurable interface thermal resistance which probably results from the increased viscosity and reduced wetting ability of particle loaded resin. Examination of bond cross sections reveals such areas of incomplete contact. No interface resistance is observed for unfilled resin where wetting appears complete. DOE

N85-13057# Brookhaven National Lab., Upton, N. Y. Process Sciences Div.
INSULATING POLYMER CONCRETE
Jack J. Fontana Apr. 1984 21 p refs Presented at the 4th Intern. Congr. on Polymers in Concrete, Darmstadt, West Germany, 19 Sep. 1984
(Contract DE-AC02-76CH-00016)
(DE84-017239; BNL-34975; CONF-8409123-1) Avail: NTIS HC A02/MF A01

An insulating polymer concrete (IPC) composite was developed under contract to the Gas Research Institute for possible use as a dike insulation material at liquid natural gas (LNG) storage facilities. In the advent of an LNG spill into the impounding dike area, the boiloff rate of the LNG can be substantially reduced if the surfaces of the dike are insulated. This increased safety at the LNG facility should reduce the hazardous explosive mixture with atmospheric air in the surrounding region. The dike insulation material must have a low thermal conductivity and be unaffected by environmental conditions. The IPC composites developed consist of perlite or glass nodule aggregates bound together as a closed cell structure with a polyester resin. In addition to low thermal conductivity and porosity, these composites have correspondingly high strengths and, therefore, can carry transient loads of workmen and maintenance equipment. Prefabricated IPC panels were installed experimentally and at least one utility is currently considering a complete installation at its LNG facility. DOE

N85-13058# Cornell Univ., Ithaca, N.Y. Dept. of Materials Science and Engineering.
HIGH TEMPERATURE MECHANICAL PROPERTIES OF CERAMICS Progress Report, 1 Dec. 1983 - 30 Nov. 1984
Rishi Raj Aug. 1984 9 p refs
(Contract DE-AC02-77ER-04386)
(DE84-016492; DOE/ER-04386/7; COO-4386-7) Avail: NTIS HC A02/MF A01

The principal accomplishment during last year which was the completion of a model for predicting the generation of flaws during a sintering process is reported. The model leads to results, which if validated through experiments, can have a significant impact on increasing the reliability of structural ceramics. The cogent results of the model are summarized. DOE

N85-13059# Los Alamos Scientific Lab., N. Mex. Advanced Engineering Technology Group.
PROGRESS ON SOLAR ABSORBER SELECTIVE PAINT RESEARCH
Stanley W. Moore 1984 10 p refs Presented at the SPIE Ann. Tech. Symp. on Optics and Electro-Optics, San Diego, Calif., 19-24 Aug. 1984
(Contract W-7405-eng-36)
(DE84-015536; LA-UR-84-2422; CONF-840872-11) Avail: NTIS HC A02/MF A01

The development of solar absorber selective paints is described. The goal is to develop an inexpensive, durable selective coating with moderately good optical properties. Research programs monitored by Los Alamos, the research efforts in progress at Los Alamos, durability evaluations, and the progress that has been made toward commercialization are reported. DOE

N85-13060# General Electric Co., St. Petersburg, Fla. Neutron Devices Dept.
EFFECT OF DOPING ON THE VOLTAGE HOLDOFF PERFORMANCE OF ALUMINA INSULATORS IN VACUUM
H. Craig Miller 21 Sep. 1984 14 p refs
(Contract DE-AC04-76DP-00656)
(DE84-017163; GEPP-TIS-833) Avail: NTIS HC A02/MF A01

Alumina ceramics doped with various combinations of Cr, Mn, and Ti were fabricated into hollow cylindrical insulators, then assembled into vacuum diodes and tested with 25-(MU)s voltage pulses. Four doped alumina ceramics with total dopant levels of 2.6 to 4.7 wt % and partial Cr plus Ti dopant levels of 1.0 to 2.4% performed very well. They had voltage holdoffs significantly better than plain alumina ceramics. Ceramics with total dopant levels of 5.3 to 5.6% performed only slightly better than plain alumina. Ceramics with partial Cr plus Ti dopant levels of 3.8 to 4.0% had significantly improved voltage holdoff capabilities, but undesirably high permanent failure rates. Ceramics with total dopant levels greater than 7% performed very poorly, nearly all suffered permanent damage from breakdowns. These results suggest that desirable upper limits for doping are 5% for total dopants and 3% for Cr and Ti combined. It is found that doping a 94% Al2O3 alumina ceramic with appropriate amounts of Cr, Mn, and Ti can significantly improve the voltage holdoff capability of insulators fabricated from such ceramics. These doped ceramic insulators are suitable for use in ultrahigh vacuum applications. DOE

N85-13061# Badische Anilin- und Soda-Fabrik A.G., Ludwigshafen am Rhein (West Germany). ZD Farbenlab.
FLUORESCENT DYES FOR LUMINESCENT SOLAR CONCENTRATORS Final Report, Jun. 1983
Ruediger Iden, Guenther Seybold, Andreas Stange, and Heinz Eilingsfeld Bonn Bundesministerium fuer Forschung und Technologie Aug. 1984 115 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-84-164; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 24

Dyes were developed, for application in luminescent solar concentrators. Most suitable are perylen dyes and perylimid dyes, boron complexes of naphtholactam dyes and polycarbocyclic dyes. These compounds cover the whole color range from yellow to blue. In the yellow shade a perylimid shows extraordinary long term stability. A very stable blue dye emits over 650 nm with quantum yield of 92%. Methods for high purification of fluorescent dyes were worked out on a semitechnical scale. Author (ESA)

N85-13062# Societe Nationale Industrielle Aerospatiale, Les Mureaux (France).
OPTIMIZATION OF THE INJECTION PROCESS FOR THERMOSTATIC POLYETHER-ETHER-KETONE (PEEK) THERMOPLASTICS REINFORCED WITH SHORT CARBON FIBERS [OPTIMISATION DE L'INJECTION DES THERMOPLASTIQUES THERMOSTABLES PEEK RENFORCES DE FIBRES COURTES DE CARBONE]
Ph. Hornet (Ecole Nationale Superieure des Arts et Metiers), K. Stocklin, and J. P. Spigolis 1984 3 p refs In FRENCH Presented at Carbone 1984, 2-6 Jul. 1984
(SNIAS-842-422-102) Avail: NTIS HC A02/MF A01

The injection parameters of polyether-ether-ketone (PEEK) reinforced with 30% carbon fibers were studied, to determine the effects on the characteristics of molded products. Injection pressure, injection velocity, mold temperature and hold pressure were examined. The effects on 11 physical or mechanical properties were examined. It is shown that lower temperatures and holding pressures minimize the thermal expansion. Lower cooling velocities have a positive influence on the temperature dependent mechanical properties. Author (ESA)

N85-13063# Daedalean Associates, Inc., Woodbine, Md.
PROTECTIVE COVERINGS FOR FIBER REINFORCED EPOXY COMPOSITES Final Report, 13 Sep. 1977 - 30 Jun. 1984
J. R. Yokley and R. S. Weinreich Jun. 1984 125 p refs Sponsored in part by Navy
(Contract MA-7-38048)
(PB84-231059; RSW-7773A-001-TR; MA-RD-760-84-023) Avail: NTIS HC A06/MF A01 CSCL 11C

Work performed in the development of protective elastometric coverings for application to fiber reinforced epoxy composites to be used in a submerged marine environment is discussed. Work was performed in identifying optimum substrate/primer/covering systems and in identifying nonstandard adhesion enhancement/bonding techniques. Data was generated concerning application techniques, various physical properties and long term saltwater immersion effects on adhesion. GRA

N85-12961*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THERMOPLASTIC/MELT-PROCESSABLE POLYIMIDES
T. L. St.Clair and H. D. Burks *In its* Tough Composite Mater. Dec. 1984 p 337-355 refs (For primary document see N85-12941 04-24)
Avail: NTIS HC A17/MF A01 CSCL 11B

N85-12962*# Aerotherm Acurex Corp., Mountain View, Calif.
ALIPHATIC-AROMATIC HETEROCYCLICS AS POTENTIAL THERMOPLASTICS FOR COMPOSITE MATRICES
Chad B. Delano and Charles J. Kiskiras *In* NASA. Langley Research Center Tough Composite Mater. Dec. 1984 p 357-377 (For primary document see N85-12941 04-24)
Avail: NTIS HC A17/MF A01 CSCL 11B

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N85-13064# Committee on Science and Technology (U. S. House).
METHANE-FUELED VEHICLE RD AND D
Washington GPO 1984 91 p Hearing before the Subcomm. on Transportation, Aviation and Mater. of the Comm. on Sci and Technol., 98th Congr., 2nd Sess., No. 92, 26 Apr. 1984
(GPO-37-926) Avail: Subcommittee on Transportation, Aviation and Materials

The proceedings of a hearing before the House Subcommittee on Transportation, Aviation Materials regarding methane-fueled vehicles are presented. The Department of Energy's implementation of Public Law 96-512, the Methane Transportation Research, Development and Demonstration Act of 1980, was considered. Modifications in this program are addressed in order to more effectively deal with some of the more pressing issues of methane fuel, such as emissions and refueling. R.S.F.

N85-13065# Sandia Labs., Albuquerque, N. Mex.
EFFECT OF OXIDE COATED THICKNESS ON THERMAL IGNITION OF TITANIUM-BASED PYROTECHNICS
Kenneth L. Erickson 1984 20 p refs Presented at the 9th Intern. Protechnics Seminar, Colorado Springs, 6 Aug. 1984
(Contract DE-AC04-76DP-00789)
(DE84-013061; SAND-84-0459C; CONF-840867-3) Avail: NTIS HC A02/MF A01

The effect which variations in oxide coating thickness can have on thermal ignition of titanium-based pyrotechnics was examined theoretically. The analyses were developed using previously published experimental studies of ignition mechanisms. Those studies indicated that ignition is controlled by the rate at which an already existing oxide coating dissolves in the bulk metal. The specific case of hot-wire ignition at near minimum energy was considered. It was assumed that oxide dissolution occurs by molecular diffusion, and an approximate ignition model was developed to examine the relative variations in ignition times which result from variations in oxide coating thickness. The model consists of a heat conduction equation or the wire and pyrotechnic and a Fick's-law diffusion equation, with Arrhenius-type diffusion coefficient, for the oxygen in the titanium particles. DOE

N85-13066*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LIQUID PHASE PRODUCTS AND SOLID DEPOSIT FORMATION FROM THERMALLY STRESSED MODEL JET FUELS
Walter S. Kim and David A. Bittker Nov. 1984 30 p refs
(NASA-TM-86874; E-2334; NAS 1.15:86874) Avail: NTIS HC A03/MF A01 CSCL 21D

The relationship between solid deposit formation and liquid degradation product concentration was studied for the high temperature (400 C) stressing of three hydrocarbon model fuels. A Jet Fuel Thermal Oxidation Tester was used to simulate actual engine fuel system conditions. The effects of fuel type, dissolved oxygen concentration, and hot surface contact time (reaction time) were studied. Effects of reaction time and removal of dissolved oxygen on deposit formation were found to be different for n-dodecane and for 2-ethylnaphthalene. When ten percent tetralin is added to n-dodecane to give a simpler model of an actual jet fuel, the tetralin inhibits both the deposit formation and the degradation of n-dodecane. For 2-ethylnaphthalene primary product analyses indicate a possible self-inhibition at long reaction times of the secondary reactions which form the deposit precursors. The mechanism of the primary breakdown of these fuels is suggested and the primary products which participate in these precursor-forming reactions are identified. Some implications of the results to the thermal degradation of real jet fuels are given. R.S.F.

N85-13067# Monsanto Co., Dayton, Ohio.
VARIABILITY OF MAJOR ORGANIC COMPONENTS IN AIRCRAFT FUELS. VOLUME 2: ILLUSTRATIONS Interim Report, Dec. 1982 - Nov. 1983
B. M. Hughes, G. G. Hess, K. Simon, S. Mazer, and W. D. Ross Tyndall AFB, Fla. AFESC 27 Jun. 1984 218 p
(Contract F08635-83-C-0067)
(AD-A145831; AFESC/ESL-TR-84-02-Vol-2) Avail: NTIS HC A10/MF A01 CSCL 21/4

This report summarizes qualitative and quantitative data on the chemical variability of approximately 300 features (chemical components or mixtures of components) with concentrations greater than 0.1 mg/ml in Air Force distillate fuels obtained from over 50 sources. These data were obtained to better understand the environmental effects of possible fuel spills and to serve as a data baseline in photochemical smog and soot formation studies. Fifty-four petroleum-derived JP-4 fuels, one shale-derived JP-4 fuel, and one petroleum derived JP-5 fuel were analyzed. The variability of the absolute concentrations in mg/ml was assessed for each feature in the capillary GC/FID (gas chromatography/flame ionization detection) analysis of the 54 fuels. Data base management programs developed and used in this assessment included the calculation of averages, ranges, standard deviations, and percent relative standard deviations of the 300 chromatographic feature concentrations in duplicate analyses of almost all of the fuels. GRA

N85-13068# Cornell Univ., Ithaca, N.Y. Coll. of Agriculture and Life Sciences.
CONSTRUCTION OF A BACTERIUM TO CONVERT CELLULOSE TO ETHANOL Final Report
W. Dexter Bellamy Mar. 1984 58 p refs Sponsored by New York State Energy Research and Development Authority
(TI84-901639; NYSERDA-84-5; Rept-504-EU-TCE-83) Avail: NTIS HC A04/MF A01

If the production of ethanol from biomass is to become viable on a commercial level, inexpensive and stable enzymes to digest cellulose (cellulases) must be available in relatively large quantities.

Of the three enzymes required for the digestion of cellulose, Beta-glucosidase and/or cellabiase are the least heat stable and therefore the limiting step. The threefold purposes are: (1) select thermophilic actinomycetes producing high levels of Beta-glucosidase; (2) evaluate means for the harvesting and storage of cellulases produced from soluable substrates; and (3) isolate or produce new ethanol-producing thermophiles which are ethanol-tolerant. B.G.

N85-13069# Union Carbide Corp., Tarrytown, N.Y. Molecular Sieve Dept.
LIQUID HYDROCARBON FUELS FROM SYNGAS Quarterly Report, Jun. - Aug. 1983
1983 357 p
(Contract DE-AC22-81PC-40077)
(DE84-015942; DOE/PC-40077/T5; QR-10) Avail: NTIS HC A16/MF A01

Twelve catalyst test runs were made; ten of these runs used catalysts that contained cobalt as the metal component, while the remaining two runs used catalysts that contained iron as the metal component. Five of the ten cobalt catalyst test runs were made with the catalysts containing one of two different shape selective components (UCC-101 and UCC-108) at two different metal component: shape selective component ratios (1:1 and 3:14). The remaining five cobalt catalyst test runs were made with the catalysts containing different additives incorporated into the cobalt. The five cobalt catalyst test runs using catalysts with different additives showed that these additives had pronounced effects on the catalysts' activity, selectivity, and stability. The most outstanding effect was realized with the additive used in the Run 9 catalyst. DOE

N85-13070# California Univ., Livermore. Lawrence Livermore Lab.
MEASUREMENT OF SHOCK AND INDUCED REACTION IN ROCKET PROPELLANTS BY NANOSECOND INFRARED RADIOMETRY AND PHOTOGRAPHY
W. VonHolle, J. Kury, E. James, and K. Scribner 4 Jun. 1984 10 p Presented at JANNAF Propulsion Systems Hazards Meeting, Aberdeen, Md., 18-22 Jun. 1984
(Contract W-7405-eng-48)
(DE84-013209; UCRL-90322; CONF-8406136-2) Avail: NTIS HC A02/MF A01

The technique of two-color infrared radiometry with 5 ns resolution was established as a useful tool in the investigation of shock-induced heating and reaction in high explosives, both in the detonation and build up phase, as well as inert pressed powders and propellants. These experiments all seem to form a consistent picture of hot spot formation and growth or cooling. The work on propellants has just begun; however, the results appear promising. Thus far the conclusions are consistent with the earlier findings concerning the high degree of involvement of the energetic binder. This may be modified by the increased evidence for initial concerted reactions of the binder and the solid interface to form hot spots, whose nature is sensitive to the solid components present. DOE

N85-13071# Santa Clara Univ., Calif.
ADVANCED CONCEPTS FOR METHANOL FUEL VEHICLES
Richard K. Pefley 1984 3 p Presented at SCAQMD Methanol Symp.
(Contract DE-FG03-84CE-50036)
(DE84-013612; DOE/CE-50036/T4) Avail: NTIS HC A02/MF A01

Arguments are presented for a car of the future of standard size with a small air-cooled 2-cycle methanol-fueled engine running at high rpm using half as much energy to produce current levels of comfort and performance. DOE

N85-13072# Research Inst. of National Defence, Stockholm (Sweden).
OFFICIAL JOURNEY TO USA, NOVEMBER 1983. SYMPOSIUM ON THE COMPATIBILITY OF EXPLOSIVES; MOUND LABORATORY; NAVAL SURFACE WEAPONS CENTER
Anita Alm Aug. 1984 45 p refs In SWEDISH; ENGLISH summary Proc. of Joint Symp. on Compatibility and Processing of Plastics/Mater. with Explosives, Propellants, Pyrotech. and Ingredients, Lake Ozark, Mo., 31 Oct.-2 Nov. 1983; sponsored by American Defense Preparedness Association
(FOA-C-20548-D1; ISSN-0347-3694) Avail: NTIS HC A03/MF A01

The compatability of explosives with other materials, the stability of explosives, chemical and physical analyses of explosives process technology and environmental and safety aspects are discussed. Author (ESA)

N85-13073# Research Inst. of National Defence, Umea (Sweden).
METHOD FOR EVALUATING PETROL PRODUCTS CORROSIVITY USING PIEZOELECTRIC CRYSTALS. PART 2: INSTRUCTION MANUAL
Bjoern Hedman and Roger Roffey May 1984 24 p refs In SWEDISH; ENGLISH summary Sponsored by Swedish National Board of Economic Defence and Swedish Defence Material Administration
(FOA-C-40198-B4; ISSN-0347-2124) Avail: NTIS HC A02/MF A01; Research Institute for National Defence, Stockholm KR 50

A method based on the use of piezoelectric crystals covered with silver was developed for measuring the corrosivity of stored jet fuel. Sample handling the use of instruments and crystals analysis procedures and the different problems that may appear are described. Author (ESA)

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N85-13074# Committee on Science and Technology (U. S. House).
FIRE PREVENTION AND CONTROL
Washington GPO 1984 296 p refs Field hearings before the Subcomm. on Sci., Res. and Technol. of the Comm. on Sci. and Technol., 98th Congr., 1st and 2nd Sess., No. 98, 14 Oct. 1983 and 22 Jun. 1984
(GPO-30-743) Avail: Subcommittee on Science, Research and Technology

Testimony concerning fire prevention and control is given. Education, safety, and training issues are discussed. R.J.F.

N85-13075# Hokkaido Univ., Sapporo (Japan).
BULLETIN OF THE FACULTY OF ENGINEERING, HOKKAIDO UNIVERSITY, NO. 123
Oct. 1984 89 p refs In JAPANESE; ENGLISH summary
(ISSN-0385-602-X) Avail: NTIS HC A05/MF A01

Dynamic stresses within soft materials caused by the detonation of explosives were investigated. The Faradaic current through a bipolar electrode was measured. The ignition characteristics of ethanol in a glow plug-assisted diesel engine are analyzed. The theory of generalized complete implication matrix is described. A method for automatic homonym selection by use of character chain matching was developed. A mathematical model of visual output function is discussed. Rectangular plates are analyzed on the basis of Reissner theory. For individual titles, see N85-13076 through N85-13081.

N85-13076# Hokkaido Univ., Sapporo (Japan).
ESTIMATION OF DYNAMIC STRESSES AROUND THE SHOT POINT BY SCALE MODEL EXPERIMENT c39
Masuyuki Ujihira and Hiroshi Shimauchi *In its* Bull of the Fac. of Eng., Hokkaido Univ., No. 123 Oct. 1984 p 1-14 refs In JAPANESE; ENGLISH summary (For primary document see N85-13075 04-31)
Avail: NTIS HC A05/MF A01

In order to evaluate the adaptability of the Similar Law to the problems of dynamic stresses within soft material caused by detonation of explosives, two types of blasting experiments were

carried out. One of them was the small scale laboratory experiment and the other one was the actual scale shotfiring test in an underground drift. In every experiment, dynamic strain waves were measured, from which dynamic stresses were calculated by the elastic theory. As a result of analyses, it was found that the Similar Law could be applied in these blasting stress problems and the stresses could be estimated around the actual scale blasting from small scale model experiments. Furthermore, it is considered that in the case where the direction of dynamic stress of blasting sigma sub r max corresponds to that of maximum principle burden stress sigma sub 1 shearing yield condition of the coal seam is apt to be satisfied. So, in driving in the steep dip coal seam, additional stresses by blasting could act most effectively and widely in the upper zone of the working face.
Author

N85-13077# Hokkaido Univ., Sapporo (Japan). Dept. of Metallurgical Engineering.
DETERMINATION OF FARADAIC CURRENT THROUGH A BIPOLAR ELECTRODE IN ACIDIC BICHROMATE c33
Takeshi Sasaki and Tatsuo Ishikawa *In its* Bull. of the Fac. of Eng., Hokkaido Univ., No. 123 Oct. 1984 p 15-26 refs In JAPANESE; ENGLISH summary (For primary document see N85-13075 04-31)
Avail: NTIS HC A05/MF A01

In order to elucidate the factors determining the proportion of the Faradaic current to the applied one, the Faradaic current through a bipolar electrode was measured under various conditions in acidic bichromate solutions. A modified electrode was adopted for measurement of the Faradaic current in a compactly packed cell. The bipolar electrodes consisted of graphite disks with many drilled holes. The by-pass resistance, the electric resistance of the electrolyte filling the holes, widely varied with functions of the diameter and the number of the holes and the thickness of the electrodes. The interelectrode gaps were also varied. The proportion of the Faradaic current to the applied one was substantially determined by the by-pass resistance independent of the diameter and the number of holes, and the thickness of the electrode. As continuous electrolysis was carried out in the acidic bichromate solutions, the proportion of the Faradaic current remarkably decreased in low concentrations of Cr(VI) and this was responsible for the decrease in the gross current efficiency in the bipolar electrode cell.
Author

N85-13078# Hokkaido Univ., Sapporo (Japan).
EXPERIMENTAL STUDY ON THE GLOW PLUG AIDED ALCOHOL DRIVEN DIESEL ENGINE c37
Tadashi Murayama, Noboru Miyamoto, Takemi Chikahisa, and Hideyuki Ogawa *In its* Bull. of the Fac. of Eng., Hokkaido Univ., No. 123 Oct. 1984 p 27-41 In JAPANESE; ENGLISH summary (For primary document see N85-13075 04-31)
Avail: NTIS HC A05/MF A01

Forced ignition with glow plugs has a great potential for the utilization of alcohol fuels in diesel engines. However, the installation of glow plugs may cause misfiring or knocking in parts of the operating range. The factors influencing the ignition characteristics of ethanol in a glow plug-assisted diesel engine are analyzed. These factors may be classified into two categories: the factors related to the temperature history of the droplets before contact with the glow plug, and those related to the probability of contact. By optimizing these factors, the combustion difficulties were successfully eliminated over the whole operating range, and engine performance comparable with conventional diesel operation was achieved.
R.S.F.

N85-13079# Hokkaido Univ., Sapporo (Japan).
IMPLICATION STRUCTURES FOR GENERALIZED IMPLICATION MATRIX IN ISM c39
Satoshi Kase, Azuma Ohuchi, Masahito Kurihara, and Ikuo Kaji *In its* Bull. of the Fac. of Eng., Hokkaido Univ., No. 123 Oct. 1984 p 43-53 refs In JAPANESE; ENGLISH summary (For primary document see N85-13075 04-31)
Avail: NTIS HC A05/MF A01

The theory of generalized complete implication matrix is described which expresses the implication structures of interpretive structural modeling (ISM). Explicit expression of the complete implication matrix is obtained by analyzing the implication relations. A simple three-step algorithm is proposed for generating the complete implication matrix by using this result. The theory makes it possible to do transitive embedding process of ISM flexibly. The results obtained include a Warfield interconnection theory as a special case.
Author

N85-13080# Hokkaido Univ., Sapporo (Japan).
A MATHEMATICAL MODEL OF VISUAL PERCEPTION REGARDING PERIPHERAL VISION AND ITS APPLICATION TO THE HERMANN'S ILLUSION c53
Takamasa Oyama, Takahiro Yamanoi, Toshimasa Yamazaki, and Michiaki Kawaguchi *In its* Bull. of the Fac. of Eng., Hokkaido Univ., No. 123 Oct. 1984 p 67-76 refs In JAPANESE; ENGLISH summary (For primary document see N85-13075 04-31)
Avail: NTIS HC A05/MF A01

Human visual perception is treated on the basis of the concepts of receptive field in physiology and in psychology. The distribution of receptive field on the retina is assumed by the fact that the central vision differs from the peripheral one. A function is introduced so that it fits the assumption. A mathematical model of visual output function is determined by the function introduced and by the model of the lateral inhibition. The deeper understanding of the mechanism of the Hermann's illusion is acquired by this model.
Author

N85-13081# Hokkaido Univ., Sapporo (Japan).
ANALYSIS BASED ON REISSNER THEORY FOR RECTANGULAR PLATES WITH ALL EDGES BUILT-IN c37
Satoshi Otsu, Takeshi Uchiyama, and Yoshizo Dobashi *In its* Bull. of the Fac. of Eng., Hokkaido Univ., No. 123 Oct. 1984 p 77-89 refs In JAPANESE; ENGLISH summary (For primary document see N85-13075 04-31)
Avail: NTIS HC A05/MF A01

Taking into account the shear effect for differently loaded, all-edge-built in rectangular plates, a system of series solutions of the Reissner type is obtained where the numerical results are comparable with those of the classic thin plate analysis. The results are intended to furnish a means of checking such an effort potentially due to finite element or other analysis. This may be supplementary to the currently available knowledge of pertinent elastic solutions since it seems insufficient other than for simply supported cases.
R.S.F.

N85-13082# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
UNDERGROUND ENGINEERING (SELECTED ARTICLES)
30 Apr. 1984 18 p Transl. into ENGLISH from Dixia Gongcheng (China), no. 2, 1983 p 22-33
(AD-A141053; FTD-ID(RS)T-0122-84) Avail: NTIS HC A03/MF A01 CSCL 13/13

Statistical analysis is used to evaluate the strength of underground injected concrete structures. The objective was to explore a method to test the strength at an early stage. Empirical formulas were derived to correlate the strength measured in an early stage to that of a later stage. Also, the repair and reinforcement of underground structures is discussed. Methods for finding the causes of cracks and deformation are given, as well as procedures for repair.
R.J.F.

N85-13083# Hemlock Semiconductor Corp., Mich.
DEVELOPMENT OF A POLYSILICON PROCESS BASED ON CHEMICAL VAPOR DEPOSITION OF DICHLOROSILANE IN AN ADVANCED SIEMEN'S REACTOR Final Report, 11 Oct. 1982 - 21 May 1983
J. R. McCormick, A. N. Arvidson, D. H. Sawyer, and D. M. Muller
14 Jul. 1984 40 p refs Prepared for JPL
(Contract NAS7-100)
(NASA-CR-174148; DOE/JPL-955533-83; NAS 1.26:174148; DE84-017155) Avail: NTIS HC A03/MF A01 CSCL 13H

Dichlorosilane (DCS) was used as the feedstock for an advanced decomposition reactor for silicon production. The advanced reactor had a cool bell jar wall temperature, 300(0)C. The cooler wall temperature allows DCS flow rates and concentrations. A silicon deposition rate of 2.28 gm/hr cm was achieved with power consumption of 59 kWh/kg. It is suggested that a 2.8 gm/hr cm deposition rate is possible. The 2.8 gm/hr cm deposition rate surpasses the goal of 2.0 gm/hr cm. Power consumption and conversion should approach the program goals of 60 kWh/kg and 40%. Stainless steel, Hastalloy B, Monel 400 and 1010-1020 carbon steel were placed individually in an experimental scale reactor. Silicon was deposited from trichlorosilane feedstock. The resultant silicon was analyzed for electrically active and metallic impurities and carbon. No material contributed significant amounts of electrically active or metallic impurities, but all contributed carbon. Single crystal growth was not maintained in most zone refining evaluations. Most materials are considered for use in construction of decomposition reactor components for production of photovoltaic grade silicon; however, further evaluation and the use of the low carbon alloys is recommended. E.A.K.

N85-13084# Sandia Labs., Albuquerque, N. Mex. Mechanical Process Engineering Div.

ELECTROPULSE CHEMICAL MACHINING

Travis A. Allen and Steven D. Rospopo Aug. 1984 14 p refs
(Contract DE-AC04-76DP-00789)
(DE84-016693; SAND-83-2248) Avail: NTIS HC A02/MF A01

Electropulse Chemical Machining, a new technique in chemical milling was applied to the photoforming of molybdenum. Direct current was applied in short pulses at current densities of thousands of amperes per square foot with little thermal degradation of resists or workpieces. Etch rates an order of magnitude faster than those of existing methods, with a corresponding improvement in surface finish were achieved. Equipment designed for pulse plating can be used and is readily available from plating suppliers. Chemicals are commercially available and may be diluted to levels that protect resist images, reduce hazards to personnel, and simplify disposal. DOE

N85-13085# Societe Nationale Industrielle Aerospatiale, Paris (France). Dept. Production-Recherches.

ELECTROFORMING OF NICKEL [L'ELECTROFORMAGE DU NICKEL]

G. Durivaud 1984 26 p In FRENCH
(SNIAS-841-501-101) Avail: NTIS HC A03/MF A01

Nickel electroforming applications to aeronautical construction materials are examined. The properties of electroformed nickel are discussed. The ease with which it can be used to manufacture complex geometry bodies, the excellent mechanical and chemical properties and the moderate cost are advantages of the technique. Author (ESA)

N85-13086# Toledo Univ., Ohio. Dept. of Civil Engineering.

SKID RESISTANCE OF BITUMINOUS SURFACES IN OHIO Final Report

D. C. Colony Mar. 1984 134 p refs Sponsored in part by Ohio Dept. of Transportation and Federal Highway Administration
(PB84-234491; FHWA/OH-84/006) Avail: NTIS HC A07/MF A01 CSCL 13B

Statistical studies of skid number (SN) on the state highway system in Ohio reveal apparently systematic variations in distributions of SN among the twelve districts in the state. These variations appear to be significantly related to traffic and to geological characteristics of a given district. Regression calculations using traffic index, a function of ADT and age of the pavement surface in months, show a high correlation with SN, although standard errors of estimate were too large to make the equations useful for predicting SN from traffic variables. Similar results were obtained by elating SN to physiographic features in the state. Pavement surface type (bituminous or pcc) and coarse aggregate type (limestone, gravel or slag) are significantly related to SN. GRA

N85-13087# American Meteorological Society, Boston, Mass.

REVIEW OF THE ATTRIBUTES AND PERFORMANCE OF SIX URBAN DIFFUSION MODELS Final Report, Oct. 1982 - Sep. 1983

F. D. White Aug. 1984 105 p refs Sponsored by EPA
(PB84-236850; EPA-600/3-84-089) Avail: NTIS HC A06/MF A01 CSCL 13B

The American Meteorological Society conducted a scientific review of a set of six urban diffusion models. Three independent model reviews conducted to evaluate the models are presented. General conclusions include: (1) all of the six models are very similar to each other and represent simple approximations of the urban diffusion situations in a given time period with no horizontal variability of the boundary layer structure or depth; (2) none of the models can be considered state-of-the-art since a great deal has been learned about the planetary boundary layer that could be incorporated into such models; (3) the models all use an all or nothing approach to plume penetration; either the plume penetrates the elevated inversion and is lost to the computation or it is completely trapped; and (4) the four annual models all produced good estimates of the observed concentrations, while, of the short-term models, TEM-8A seriously overpredicted at night and RAM seriously underpredicts during the day. GRA

N85-13088# National Bureau of Standards, Washington, D.C. Center for Building Technology.

SELECTION, PROCUREMENT AND DESCRIPTION OF SALEM LIMESTONE SAMPLES USED TO STUDY THE EFFECTS OF ACID RAIN

M. Ross (Geological Survey, Reston, Va.) and L. Knab Jul. 1984 23 p refs Sponsored in part by National Park Service
(PB84-231067; NBSIR-84-2905) Avail: NTIS HC A02/MF A01 CSCL 13C

The selection, procurement, and description of the Salem Limestone to be used in field exposure tests to assess the effects of acid rain on building stone are described. The rationale for choosing Salem Limestone is given and a brief geological description of the stone is provided. Preparation of the stone samples for field exposure, including cutting, surface finishing and labelling is presented. GRA

N85-13089# Earthquake Engineering Research Inst., Berkeley, Calif.

REFINED MODELING OF REINFORCED CONCRETE COLUMNS OF SEISMIC ANALYSIS

S. A. Kaba and S. A. Mahin Apr. 1984 112 p refs
(Grant NSF CEE-83-16662)
(PB84-234384; UCB/EERC-84/03; NSF/CEE-84018) Avail: NTIS HC A06/MF A01 CSCL 13M

The fiber representation of a section is extended to make possible the analysis of reinforced concrete or steel members independently or as part of two dimensional frames. Slice locations are specified along the length of the element. Each slice is further discretized into steel and/or concrete fibers. By monitoring the various fibers and slices, it is possible to obtain the local response at critical sections including moment curvature and shear histories. Bond slip and shear effects are not considered so the multislice fiber element is suitably for modeling beams and columns in a steel or reinforced concrete especially when the effects of axial loads on strength and stiffness are significant. The element can account for axial load bending moment interaction and the pinching of hysteresis loops due to compressive loads acting on the element. The functioning of the element is tested separately and as part of a general dynamic two dimensional frame analysis program. GRA

N85-13090# Joint Publications Research Service, Arlington, Va.

EAST EUROPE REPORT: SCIENCE AND TECHNOLOGY

20 Nov. 1984 95 p refs Transl. into ENGLISH from various East European articles
(JPRS-ESA-84-041) Avail: NTIS HC A05/MF A01

Various science and technology topics are discussed. Information theory, the use of computers in industry, new operating systems, biotechnology, and microelectronics are among the topics discussed. For individual titles, see N85-13091 through N85-13094.

N85-13091# Joint Publications Research Service, Arlington, Va.
THEORY OF INFORMATION, AUTOMATION IN CZECHOSLOVAKIA
In its East Europe Rept.: Sci. and Technol. (JPRS-ESA-84-041) 20 Nov. 1984 p 5-7 Transl. into ENGLISH from Rude Pravo (Prague), 3 Oct. 1984 p 6 (For primary document see N85-13090 04-31)
Avail: NTIS HC A05/MF A01

The activities of a research facility in the areas of information theory and control theory are discussed. The development of systems theory, decision making theory, optimal control theory, and control utilizing higher level intelligence is discussed. R.J.F.

N85-13092# Joint Publications Research Service, Arlington, Va.
NEW YeS 1056 UNIFIED SYSTEM COMPUTER MODEL DESCRIBED c60
Christoph Weber, Wolfgang Lampenscherf, and Karl-Heinz Homilius *In its* East Europe Rept.: Sci. and Technol. (JPRS-ESA-84-041) 20 Nov. 1984 p 34-40 refs Transl. into ENGLISH from Rechentech./Datenverarb. (East Berlin), v. 21, no. 8, Aug. 1984 p 5-7 (For primary document see N85-13090 04-31)
Avail: NTIS HC A05/MF A01

The YeS 1056 unified system computer model is described. The YeS 1056 ends a phase in model development in which, starting with the YeS 1055 model, a number of improvements were implemented step-by-step. This development was aimed at clearly improving both applications and manufacturing efficiency and at introducing the latest research and development results into practice as quickly as possible. A new operating system and steps taken to increase performance raised throughput substantially. A considerable contribution to saving materials and energy was made with the reduction in use of copper (43-percent), aluminum (30-percent), ferrous metal (40-percent), dynamo sheet metal (90-percent) and energy consumption (50-percent). Operator and engineer conveniences were markedly improved by the introduction of the YeS 7069.M operator and service processor. A continuous model inventory effort led to expansion of the designated model inventory to over 60 types of devices. R.J.F.

N85-13093# Joint Publications Research Service, Arlington, Va.
USE OF ROBOTICS IN HEAVY MACHINERY, EQUIPMENT CONSTRUCTION INDUSTRY c37
Rolf Kersten *In its* East Europe Rept.: Sci. and Technol. (JPRS-ESA-84-041) 20 Nov. 1984 p 56-58 Transl. into ENGLISH from Presse-Inform. (East Berlin), no. 83, 19 Jul. 1984 p 2 (For primary document see N85-13090 04-31)
Avail: NTIS HC A05/MF A01

The use of robots in the heavy machinery and equipment construction is discussed. Examples of production gains at various industrial plants are given. R.J.F.

N85-13094# Joint Publications Research Service, Arlington, Va.
ROBOTICS TECHNOLOGY APPLICATION ASSESSED, STATISTICS c37
In its East Europe Rept.: Sci. and Technol. (JPRS-ESA-84-041) 20 Nov. 1984 p 59-62 Transl. into ENGLISH from Presse-Inform. (East Berlin), no. 88, 31 Jul. 1984 p 5-6 (For primary document see N85-13090 04-31)
Avail: NTIS HC A05/MF A01

The use of robots in East Germany is discussed. Applications in the areas of welding and painting, in loading machines and industrial furnaces are discussed. Automatic test equipment used to detect defects on medium-sized printed circuits is discussed. R.J.F.

N85-13095# Joint Publications Research Service, Arlington, Va.
USSR REPORT: ELECTRONICS AND ELECTRICAL ENGINEERING
28 Aug. 1984 117 p Transl. into ENGLISH from various Russian articles
(JPRS-UEE-84-010) Avail: NTIS HC A06/MF A01

Electronics and electrical engineering are the major topics discussed in this U.S.S.R. report. Areas of study include: (1) acoustics speech and signal processing; (2) antennas and propagation; (3) broadcasting/consumer electronics; (4) components, hybrids and manufacturing technology; (5) computers; (6) electron devices; (7) industrial electronics and control instrumentation; (8) instrumentation and measurement; (9) magnetics; (10) solid state circuits; and (11) sonics and ultrasonics. For individual titles, see N85-13096 through N85-13125.

N85-13096# Joint Publications Research Service, Arlington, Va.
BRAGG REFLECTION OF SURFACE ELECTROACOUSTIC SHEAR WAVES Abstract Only c32
Yu. V. Gulyayev, T. N. Kurach, V. P. Plesskiy, and V. P. Tereshkov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 1 Transl. into ENGLISH from Akust. Zh. (Moscow), v. 30, no. 1, Jan. - Feb. 1984 p 47-50 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

Bragg reflection of surface electroacoustic shear waves in piezoelectric media is analyzed and the width of the suppression band, which depends on the excitation level, is determined. The piezoelectric half-space is assumed to have an axis of sixth-order symmetry and a metallized boundary surface with an inertia load small periodic perturbation. An analysis of the dispersion equation and a correlation with reflection of volume electroacoustic shear waves reveals that, owing to the small difference between the respective velocities, the Bragg suppression band for quasi-volume surface waves will merge with the range of wave attenuation by scattering into the volume. B.W.

N85-13097# Joint Publications Research Service, Arlington, Va.
REFLECTION OF VOLUME WAVES IN MULTILAYER STRUCTURES Abstract Only c71
V. K. Razgonyayev and I. B. Yakovkin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 1-2 Transl. into ENGLISH from Akust. Zh. (Moscow), v. 30, no. 1, Jan. - Feb. 1984 p 110-113 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

The performance characteristics of devices on surface acoustic waves are immunized to influence coexisting volume waves by coarsening the bottom surface of the sound guide or mounting it on a wedge as a substrate. Author

N85-13098# Joint Publications Research Service, Arlington, Va.
PROBABILITY DISTRIBUTION DENSITY OF NORMALIZED RADAR RANGE Abstract Only c32
V. A. Melititskiy, N. S. Akinshin, and A. V. Mikhaylov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 4-5 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 2, Feb. 1984 p 26-29 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

The normalized radar range D sub n-4th root of sigma sub t squared = D/square root of 2 (sigma sub t-effective scattering surface area of target, z(2) - polarization reception coefficient, 2 - radar design parameter) and its probability distribution density are evaluated, considering that both sigma sub t and z(2) fluctuate. The envelopes of orthogonally polarized two components of a nonGaussian signal are assumed to have a Nakagami probability distribution density, a more general case than that of z(2) = const and exponential probability distribution density of the effective scattering surface area. Expressions are derived on this basis sufficiently general for calculating not only the radar range but also the probabilities of correct detection and false alarm in a random reception process. The error of the calculated mean radar range approaches zero as the parameter m > or = 1/2 in the Nakagami distribution approaches infinity. Author

N85-13099# Joint Publications Research Service, Arlington, Va.
REGENERATORS OF BINARY PULSES FOR OPTICAL COMMUNICATION SYSTEMS Abstract Only c32

O. N. Porokhov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 8 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 2, Feb. 1984 p 3-8 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

Regenerators of binary pulses are considered for optical communication systems, taking into account the particular characteristics of binary data transmission over optical cables in the primary network of the Unified Automated USSR Communication System as well as the various forms of binary pulse signals (pulse-keyed) and the various methods of their reception now in use worldwide. Linear filtration, optimally with zero threshold, or time filtration of signals for extraction of binary pulses from noise of any origin (mainly shot or thermal) and with any distribution (mainly normal or Poisson) is proposed as a means of ensuring high interference immunity and reliability of these regenerators. An additional advantage is the possibility of error monitoring without shutdown of communication. It is also possible to maximize the range of regenerator effectiveness, i.e., the distance between regenerators necessary for attaining the ultimate interference immunity level of optical communication over cables or over atmospheric and space channels. Author

N85-13100# Joint Publications Research Service, Arlington, Va.
INTERFERENCE IMMUNITY OF DIGITAL EQUIPMENT FOR COHERENT PROCESSING OF WIDEBAND SIGNALS Abstract Only **c32**
A. V. Obraztsov and V. V. Ignatov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 19-20 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 3, Mar. 1984 p 30-34 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

The interference immunity of discrete data transmission systems using large-base quasi-noise signals obtained by pseudo-random-sequence phase or frequency keying of the carrier and processing such signals in the large by means of discrete matched filters is estimated for systems with a crosscorrelational demodulator and an autocorrelational demodulator, respectively. The crosscorrelational demodulator consists of three analog-to-digital converters operating by the linear delta-modulation method, two coincidence circuits, two reversible counters acting as digital integrators, and a threshold device. The autocorrelational demodulator consists of one analog-to-digital converter, a digital delay line, one coincidence circuit, one reversible counter, and a threshold device. Calculations and analysis reveal that, owing to analog-to-digital conversion by the linear delta-modulation method, the interference immunity of both demodulators approaches the maximum attainable as the discretization frequency is increased to a large multiple of the highest frequency in the signal spectrum. Author

N85-13101# Joint Publications Research Service, Arlington, Va.
DIGITAL RADIO RECEIVERS AND PROBLEMS OF ANALOG-TO-DIGITAL CONVERSION OF NARROW-BAND SIGNALS Abstract Only **c32**
Ye. S. Poberezhskiy *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 20 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 3, Mar. 1984 p 56-63 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

Four methods of analog-to-digital conversion in digital radio receivers are described, considering that an additive mixture of signal and interference at the input of such a receiver is usually a narrow-band process. All four methods utilize the quasi-harmonic form of narrow-band oscillations. The first method is based on resolving the input process into two components in quadrature. The second method is based on representing the input process as a set of envelope reading and phase reading pairs, readings taken at a discretization frequency determined by the width of the signal spectrum and taken at low oscillation levels. The third method is based on sampling (strobing) over a time interval which, while only a fraction of 1/f sub 0 (f sub 0 = center frequency of the input signal), can be made sufficiently long to reduce integrator and memory requirements. The fourth method is based on quantization with prediction and use of redundancy for widening the dynamic range of the digital channel in the receiver. The applicability of each method is determined by its systematic error, analysis and calculation of which indicate the limitations of each method. Author

N85-13102# Joint Publications Research Service, Arlington, Va.
BRIDGE EROSION IN ELECTRICAL CONTACTS Abstract Only **c33**
Zoya Vladimirovna Shabanova and Sergey Aleksandrovich Nekrasov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 47 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved.: Elektromekhan. (Novocherkassk), no. 2, Feb. 1984 p 71-77 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

The physical process of bridge erosion in low-current electrical contacts is described by a model of mass transfer during switching, without assuming steadiness of the process and one-dimensionality of the corresponding Stefan problem. Changing of the current density, redistribution of Joule-effect sources with attendant shifting of the hot spot, and the skin effect following an increase of electrical resistance are taken into account, all these effects resulting from changes in bridge cross sections, as well as second-order thermoelectric effects. Two problems are formulated and successively solved on the basis of this model. The first problem is determining the evolution of the bridge shape from the originally cylindrical one. The equation of motion for the melting front is used for this purpose with the melting coefficients most closely approximating the solution to the exact Stefan problem. The second problem is determining the temperature field of a variable-section bridge, taking into account the temperature dependence of electrical resistivity but disregarding the less significant temperature dependence of thermal conductivity and specific heat. Author

N85-13103# Joint Publications Research Service, Arlington, Va.
ARCHITECTURE OF ADAPTIVE SPACE-FREQUENCY-TIME SIGNAL PROCESSING SYSTEM Abstract Only **c60**
V. F. Struchev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 53 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 3, Mar. 1984 p 15-20 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

Digital processing of signals in real time requires high-capacity high-speed computer systems, which applies particularly to adaptive processing. The three basic factors determining the most suitable type of system are organization of calculations made by the processor array, range of problems to be handled, and interaction of memory modules, processors, and input-output channels. In terms of the first criterion it is possible to combine single instruction or multiple instruction with single data or multiple data into four correspondingly different systems: SISD, MISD, SIMD, MIMD. In terms of the second criterion there are general-purpose, limited scope, and special-purpose processors. In terms of the third criterion there are lumped and distributed structures. The choice is based on the particular algorithm of space-frequency-time processing, all algorithms being derivable from the simple expression Y= TXo (Y- matrix of output data, X- matrix of input data, T- matrix of weight factors in the frequency-time domain for signal filtration, o - matrix of weight factors in the space domain for plotting radiation patterns). The architecture of the system as well as the structure and the capacity of its components depends on the combination and the sequence of transformations involved in the signal processing. Author

N85-13104# Joint Publications Research Service, Arlington, Va.
MICROPROCESSOR IMPLEMENTATION OF ALGORITHMS OF NONLINEAR FILTRATION Abstract Only **c60**
V. N. Kharisov, Yu. N. Kirilenko, M. I. Maklyukov, and A. I. Fedorov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 54 Transl. into ENGLISH from Radiotekhn.

(Moscow), no. 3, Mar. 1984 p 20-24 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

The basic recurrence-type algorithm of nonlinear filtration of a useful signal with an n-dimensional vector of parameters in the Gaussian approximation needs to be transformed for high-speed implementation on microprocessors with sufficiently small time discretization steps and thus facilitating signal reception in real time without significant degradation of the characteristics. In the case of slowly varying signal parameters this algorithm can be transformed by grouping of observations. In the case of a narrow-band output signal this algorithm can be transformed through quadrature representation of the input process and further through control of samples, namely control of their moments depending on the instantaneous estimates of the signal phase. These techniques are applied to optimal reception of phase-keyed signals with random phase and frequency according to the equations of filtration of discrete-continuous processes. The demodulator for this algorithm consists of an arithmetic logic unit with cache, a control unit, a data input unit with sample storage and analog-to-digital converter, a multiplier, a permanent microprogrammable memory, and a pipeline-type microinstruction register. Author

N85-13105# Joint Publications Research Service, Arlington, Va.
REVISION OF SIGNAL AND INTERFERENCE SPACE-TIME PROCESSING ALGORITHMS FOR IMPLEMENTATION BY MICROPROCESSORS Abstract Only c60
Ye. I. Glushankov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 54-55 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 3, Mar. 1984 p 48-51 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

Conventional adaptive algorithms of signal and interference space-time processing in radar and radio communication systems can be implemented by high-speed microprocessors, but only when the number of elements in the receiver antenna array is small. When the number of elements is large, then use of high-speed microprocessors requires simplification of these algorithms and an increase of their immunity to errors in digital processing. From this stand-point, three such algorithms (Windrow-Hoff steepest descent, direct inversion of sampled covariational interference matrix, Kalman filtration for estimating the vector of weight factors) are evaluated comparatively with respect to the number of arithmetical operations and required memory capacity. Implementation of these algorithms by a special-purpose microprocessor with series K584 large-scale integration and microprogram control is analyzed. Author

N85-13106# Joint Publications Research Service, Arlington, Va.
EFFICIENCY OF COMPUTER SYSTEM DIGITAL PROCESSING OF SIGNALS Abstract Only c60
V. F. Struchev and V. P. Lvshin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 55-56 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 3, Mar. 1984 p 52-55 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

A computer system for adaptive space frequency time processing of signals is considered which features maximum possible paralleling of identical modules so as to ensure high productivity. Each module contains one or several microprocessors operating with an appropriately distributed common memory, capable of performing such operations as complex addition and multiplication, with means available for data transposition from a cell of one module to a non-corresponding cell of another. The efficiency of this system is evaluated in terms of two parameters: s-user speed attainable in solving an individual problem and ratio s/s(n) of s-user speed to normal speed of all modules. The first problem is determining the number of parallel modules, which is equal to the number of space channels and in the case of adaptive processing must provide for recurrent intermodular data transposition. A procedure is established entailing a sequence of 10 system operations, each with a corresponding module operation and for which the processing time, the processed data volume, and the corresponding memory load are then determined. Author

N85-13107# Joint Publications Research Service, Arlington, Va.
GLOW SPOTS AND BREAKDOWN IN GaAs TRANSISTOR STRUCTURE Abstract Only c33
B. S. Kerner, N. A. Kozlov, A. M. Nechayev, and V. F. Sinkevich *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 58 Transl. into ENGLISH from Fiz. i Tekhn. Poluprov. (Leningrad), v. 17, no. 11, Nov. 1983 p 1931-1934 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

A study of field effect transistors with GaAs structure and a Schottky gate established that the cause of irreversible changes preceding breakdown in such devices is the localized emission of radiation and the appearance of glow spots following the formation of multifilar and multidomanial states. Current voltage characteristics were measured through the operating range into the cut off range. Glow spots with attendant irreversible changes in the interelectrode (drain-gate) region were recorded before and during breakdown. Breakdown of the drain domain is preceded by melting of gallium in the brightest spots in this region and migration of the liquid toward the gate, after formation of craters in the n-GaAs film from which drops of liquid gallium had exuded to settle on the surface. Breakdown of the Schottky barrier preceded by isothermal instability with attendant redistribution of the electric field in the grain gate region. Author

N85-13108# Joint Publications Research Service, Arlington, Va.
LIFETIME OF EXCESS CHARGE CARRIERS IN WEAKLY DOPED EPITAXIAL GaAs LAYERS Abstract Only c76
B. I. Grigoryev, V. G. Danilchenko, and V. T. Korolkov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 59 Transl. into ENGLISH from Fiz. i Tekhn. (Leningrad), v. 17, no. 11, Nov. 1983 p 1953-1956 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

The effective lifetime of six semiconductor structures was determined by the difference method which completely eliminates the errors caused by nonideality of the emitter and finite width of the base, buildup of quasielectric fields in the base region, and other factors. The method involves measuring the intervals of time during which the reverse current remains constant at two amplitude levels differing by the factor e, while the amplitude of the forward current remains at the same level in each case, and then calculating the effective life-time as the difference of these two time intervals. The dependence of effective lifetime on density of the forward current at various temperatures found to be the same for all structures was plotted as well as the dependence of the saturation current density on the impurity concentration in the base region. Analysis and interpretation of the results indicates predominance of the nonradiative recombination mechanism and a dependence of the effective lifetime on the injection level. The effective lifetime either did not change or increased slightly as the temperature was raised from 20 to 160 C. Author

N85-13109# Joint Publications Research Service, Arlington, Va.
NONTHERMAL MECHANISM FOR LASER ANNEALING OF SEMICONDUCTORS AND FORMATION OF SUPER STRUCTURE Abstract Only c76
V. V. Kapayev, Yu. V. Kopayev, and S. N. Molotkov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 65 Transl. into ENGLISH from Mikroelektron. (Moscow), v. 12, no. 6, Nov. - Dec. 1983 p 499-511 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

A phase transition in a metal state under the influence of a powerful electromagnetic field is considered and a nonthermal mechanism for laser annealing is proposed for semiconductors with a diamond lattice. The possibility of forming a macroscopic superstructure which is observed in a limited interval with respect to intensity was investigated. The model is described. For an accurate description of an unbalanced phase transition from the semiconductor state into the metallic under the effect of radiation, a common solution is necessary of the kinetic equation for the unbalanced quasi-fraction, an equation of state describing the metallic and semiconductor phases, and the Maxwell equation. In such a statement, solution of the problem is possible only by numerical methods. A linear analysis of the stability of a homogeneous semiconductor state is presented. The distinctive features of the experiments on laser annealing with short radiation pulses are listed. Author

N85-13110# Joint Publications Research Service, Arlington, Va.
INVESTIGATION OF EFFECT OF PHOTOCURRENT AMPLIFICATION IN METAL-DIELECTRIC-SEMICONDUCTOR STRUCTURES BASED ON SILICON Abstract Only **c76**
A. P. Nagin, I. O. Nikitin, and V. M. Tyulkin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 66 Transl. into ENGLISH from Mikroelektron. (Moscow), v. 12, no. 6, Nov. - Dec. 1983 p 535-539 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

It is established that in a regime of volumetric, reversible avalanche multiplication of photocarriers, the amplification factor of the photocurrent is not more than 50, and the necessary condition for observation of large values of the amplification factor is the presence of steady leakage current through the structure. Assuming that the steady leakage current flows in channels with small dimensions which originate in the dielectric of the metal-dielectric-semiconductor (MDP) structure under the effect of the strong electrical field applied to it, the effect of amplification can be explained by the origination of a situation similar to that which exists in a vertical transistor and leads to a considerable amplification of the photocurrent in it. The large values of the amplification factor of the photocurrent are unstable in time and this operating condition of the MDP structure is accomplished by irreversible changes of the dielectric conductivity. For this reason use of MDP structures as photodetectors can prove to be of little promise because of their very low reliability. However, as follows from developed models, this situation can change if especial creation of a porous dielectric with stable conductive channels of sufficiently small dimensions is successful. Author

N85-13111# Joint Publications Research Service, Arlington, Va.
MATHEMATICAL MODELING OF ASSEMBLY PROCESSES INVOLVING USE OF SENSITIZED ROBOTS Abstract Only **c37**
A. A. Burtsev and V. I. Solntsev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 69 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Tekhn. Kibernetika (Moscow), no. 1, Jan. - Feb. 1984 p 148-157 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

Force-moment sensitization of the automatic manipulator is essential for robotization of assembly processes, one of the basic operations being assembly of shaft - sleeve. A mathematical model of force moment interaction in a shaft sleeve pair was constructed so as to close the system of equations of manipulator dynamics. The model covers four possible modes of shaft entrance: (1) shaft touches the sleeve edge on one side and the opposite sleeve wall inside; (2) shaft touches the sleeve edge but clears the opposite sleeve wall inside; (3) shaft clears the sleeve edge but touches the opposite sleeve wall inside; and (4) shaft clears both the sleeve edge and the opposite sleeve wall inside. The algorithm of solving the equations of dynamics for each case was programmed in FORTRAN. Calculations for vertical feed with a positioning accuracy within + or - micrometer in a typical machine tool with numeric program control agree closely with experimental data pertaining to low feed rates. For high feed rates, the model must be refined to account for transient effects. Author

N85-13112# Joint Publications Research Service, Arlington, Va.
OPTIMIZATION OF MOVEMENTS OF MANIPULATORS WITH KINEMATIC REDUNDANCY Abstract Only **c37**
A. A. Kaplunov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 70 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Tekhn. Kibernetika (Moscow), no. 1, Jan. - Feb. 1984 p 158-166 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

A manipulator with n degrees of freedom is considered, in a system of n generalized coordinates, and two problems concerned with its movement optimization are formulated. The first problem is to minimize the time of load transfer within the manipulator range from initial state to final state by selecting the vector of generalized manipulator coordinates which will accomplish this, with the initial vector of generalized manipulator coordinates and the final vector of generalized load coordinates given. The second problem is to minimize the time of load transfer within the manipulator range from initial state to final state by selecting the initial vector and the final vector of generalized manipulator coordinates which will accomplish this, with the initial vector and the final vector of generalized load coordinates given. Both problems are reformulated and solved specifically for manipulator arms of an industrial robot with six independent degrees of freedom, four for transport operations and two for tong (wrist) orientation and for another robot with five independent degrees of freedom, three for transport operations and two for tong (wrist) orientation. Author

N85-13113# Joint Publications Research Service, Arlington, Va.
CONTROLLING ROTATION OF ELASTIC MANIPULATOR LINK Abstract Only **c37**
L. D. Akulenko and N. N. Bolotnik *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 70-71 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Tekhn. Kibernetika (Moscow), no. 1, Jan. - Feb. 1984 p 167-173 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

The problem of controlling the rotation of an elastic manipulator link is analyzed by treating such a link as a thin straight inextensible beam of a homogeneous material with a uniform cross section and assuming that it rotates about a stationary axis driven by a moment of force. The two integrodifferential equations of motion, respectively describing elastic oscillations relative to an undeformable reference and change in angular momentum relative to the axis of rotation, are reduced to partial differential equations. The corresponding boundary-value problem is solved for a programmable control torque as an explicit function of time, with necessary suppression of residual elastic oscillations at the end of the braking process. After a general exact analytical solution is obtained, the control function is assumed to be piecewise-continuously differentiable during a cycle consisting of linear increase and linear decrease of the torque with direction reversal and with a constant torque time interval between each increase and decrease. On the basis of this approximate solution, the minimum time necessary is then determined for approximate (in terms of piecewise continuity) and oscillation free transfer of the link as a mechanical system from its initial state to its final state by the given mode of control. R.J.F.

N85-13114# Joint Publications Research Service, Arlington, Va.
CONTROL OF LINEAR STATIONARY OBJECTS SUBJECT TO EXTERNAL ACTIONS BY MEANS OF VARIOUS TYPES OF FEEDBACK Abstract Only **c37**
S. V. Yemelyanov, S. K. Korovin, and B. V. Ulanov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 71-72 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Tekhn. Kibernetika (Moscow), no. 1, Jan. - Feb. 1984 p 174-182 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

An automatic control with finite parameters in all regulation loops, capable of operating without measurement of external actions and without slippage, is synthesized for a certain class of dynamic objects describable by a system of nonhomogeneous equations. The problem is solved by reducing the nonhomogeneous part of these differential equations to zero and finding the control $u=u(x)+u(z)$ which will make the solution to the vector equation of the object x=v(x,u,f), either independent of or only limitedly dependent on the external actions (x=(x sub 1,...,x sub n)(T-) vector of phase coordinates, v=(v sub 1,..., v sub n)(T-) vector of phase velocity whose components depend on vector x, control vector u=(u sub 1,...,u sub n)(T), and vector-function of time f(t)= (f sub 1(t),...,f sub 1(t))(T)). With the law of variation of the adjustable parameter properly selected, the problem reduces to controlling a dynamic object with variable parameters and its solution is a continuous coordinate control U(x). This law of parameter variation is established on the basis of three theorems constraining the parameter and defining the upper bound for its variation. R.J.F.

N85-13115# Joint Publications Research Service, Arlington, Va.
ACCOUNTING FOR ERROR STOCHASTICITY IN TERMINAL HOMING OF AIRCRAFT Abstract Only **c04**
P. I. Kuznetsov, L. A. Pcelintsev, and Ye. S. Sabynin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 75 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Tekhn. Kibernetika (Moscow), no. 1, Jan. - Feb. 1984 p 213-216 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

The energy efficiency terminal homing of an aircraft is improved by correcting for the instantaneous missed hit error while accounting for the stochasticity of the latter. The problem of such a corrective control is formulated on the basis of a diffusion process as its model. The optimum strategy is defined in terms of the homing cost function and the Boltz criterion. The corresponding generalized Stefan boundary value problem with indeterminate boundary is solved by uniquely satisfying the Bellman equation. The condition of smooth splicing is established, which yields the necessary unique set of prolongations of autonomous flight. Prolongation may be based, typically, on the fuel reserve. Solution of the Bellman equation for this problem can be facilitated by the method of backward induction in time. Flight control curves were plotted and the payoff of corrective action based on error stochasticity was evaluated for various typical sets of parameter values. R.J.F.

N85-13116# Joint Publications Research Service, Arlington, Va.
SEMICONDUCTOR-TYPE TRANSDUCER WITH UNIVERSAL STRAIN GAUGE FOR MEASUREMENT OF LOW PRESSURES Abstract Only **c35**
Yu. I. Zaganyach, I. I. Maryamova, T. M. Ivashchuk, A. P. Kutrakov, and O. A. Polishchuk *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 81 Transl. into ENGLISH from Pribory i Sistemy Upr. (Moscow), no. 3, Mar. 1984 p 31-32 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

A pressure transducer with universal strain gauge was developed and introduced which is adaptable to various pressure ranges by change of membrane size. The flat membrane is welded to the cylindrical housing and coupled to the strain gauge through a plunger. The strain gauge is a small cantilever rod of uniform cross section carrying a ring with lead wires and a set of tensoresistors. Deflections of the membrane by the plunger are transmitted to that strain gauge, nonlinearity of the transducer output characteristic being minimized and its dynamic range being widened by having the plunger rigidly joined to the membrane and to the rod. The membrane is made of 36NKhTYu dispersion-hardened alloy. The transducer housing and the strain gauge rod are made of the same material, the choice of material depending on the operating temperature range: 29NK Covar for -60 to +350 C or 36N Invar for -196 to +60 C. The tensoresistors are 1.6 mm wide and 20-30 micron thick silicon needle crystals. All welded joints in assembly are made with a laser beam. There are two structural variants of this transducer available, plain 10 mm high and flat 3.5 mm high, both 10 mm in diameter. R.J.F.

N85-13117# Joint Publications Research Service, Arlington, Va.
SUPERCONDUCTING MAGNET FOR PROBING EDDY CURRENTS IN DYNAMIC MODELS Abstract Only **c33**
Oleg Ionovich Gorskiy, Viktor Aleksandrovich Dzenzerskiy, and Valeriy Yurevich Vorovskiy *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 85 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved.: Elektromekhan. (Novocherkassk), no. 2, Feb. 1984 p 92-94 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

A superconducting magnet was built for probing the electromagnetic interaction of strong magnetic fields and moving current conductors. Its main feature is a successful solution to the complex problem of force transmission from the induced magnetic field and the secondary magnetic field in a conductor to the surrounding cryostat walls. Stability of its operation without extra coolant flow is ensured by adequate thermal insulation and adequate magnetic field strength. The magnet also has a relatively small mass, operates completely reliably and safely, is vibration- and shake-proof. Its coolant requirement in the frozen field mode of operation does not exceed 1.4 1/h. The magnet coil is immersed in helium inside a 0.6x0.45x0.45x0.35 cubic meter cryostat, an indium insert providing a seal which is effective at temperatures down to 4.2 K. The magnet was designed for tangential and normal forces which correspond to an infinitely thick and long current-carrying moving aluminum bar, with a proper correction factor accounting for nonideality of the conductor in the form of finite thickness. The magnet can also be used for suspension of vehicles in high-speed ground transportation systems. R.J.F.

N85-13118# Joint Publications Research Service, Arlington, Va.
OPTIMUM DIMENSIONS OF POWER SOLENOIDS FOR MAGNETIC SUSPENSION Abstract Only **c33**
Boris Aleksandrovich Kaznacheyev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 86 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved.: Elektromekhan. (Novocherkassk), no. 2, Feb. 1984 p 94-96 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

Design optimization of power solenoids for controllable and stabilizable magnetic suspensions with force compensation in a wind tunnel is shown, assuming that the model of a levitating body is a sphere of ferromagnetic material with constant magnetic permeability. This sphere, with a radius much smaller than its distance from the solenoid above, is to be maintained in position on the solenoid axis by balance of the vertical electromagnetic force and the force of gravitation. The necessary vertical (axial) force generated by the solenoid is expressed as a function of relevant system dimensions, solenoid design parameters, and physical properties of the body. On the basis of this relation and the relation for solenoid power three families of curves are obtained which depict the solenoid power for a given force as a function of the solenoid length with either outside radius or inside radius as a variable parameter and as a function of the outside radius with inside radius as a variable parameter. These curves indicate the optimum solenoid length and outside radius, for minimum power, corresponding to a given outside radius and inside radius, respectively. R.J.F.

N85-13119# Joint Publications Research Service, Arlington, Va.
ANALYSIS OF FREQUENCY-SELECTIVE INTEGRATED CIRCUITS IN SYSTEM OF NORMAL COORDINATES Abstract Only **c33**
P. A. Arutyunov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 94 Transl. into ENGLISH from Mikroelektron. (Moscow), v. 12, no. 6, Nov. - Dec. 1983 p 540-547 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

The Tellezhen theory is used in an interpretation of the law of conservation of complex power. In this variation, the theory is generalized for the case where the current and voltage of the branches of an integrated current are random functions of time. The demonstration of the theory presented is based on fulfillment of the Kirchhoff law for electronic circuits with random currents and voltages of the branches. The simple theory given of a statistical analysis of a frequency-selective integrated circuit in a system of so-called normal coordinates which have energy dimensions is a generalized method of normal oscillations for LCR circuits. As a basis is taken a general theorem as well as an orthogonal system of vectors of the modes and a system of normal coordinates of the circuit; the latter is a projection of the vectors of reaction on the vectors of normal oscillations. Use of a canonical expansion of random functions for currents and voltages considerably simplifies computation of integrated circuits. In this case, the reaction for mathematical expectations is computed at first, and later for coordinate functions with zero input and zero state of the circuit. The results obtained can be extended to circuits with controlled sources. R.J.F.

N85-13120# Joint Publications Research Service, Arlington, Va.
MACHINE COMPUTATION OF DELAY AND CAPACITANCE OF TRANSISTOR STRUCTURES OF SUBNANOSECOND LARGE INTEGRATED CIRCUITS Abstract Only **c33**
A. N. Bubennikov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 95 Transl. into ENGLISH from Mikroelektron. (Moscow), v. 12, no. 6, Nov. - Dec. 1983 p 548-560 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

The delay time and capacitance of the transistor structure (TS), which reveals the coupling of the parameters of technology and topology with the inertial characteristics of the TS of large integrated circuits (LIC) with the aid of methods and programs of technological, physic/topological modelling and optimization within the framework of multilevel modelling of LIS was identified. The requirements for high quality modelling, identification and optimization of the transistor structure, linear element and fragments of LIS within the framework of a complete cycle of an automated design system (SAPR) of LIS is dependent upon a list of the basic factors for development of an elementary base. The following items are considered in detail: (1) technological model of TS LIS; (2) physical/topological model of TS LIS; (3) computation of inertia characteristics of TS; and (4) results of physical/topological modelling. E.A.K.

N85-13121# Joint Publications Research Service, Arlington, Va.
COMPARISON ANALYSIS OF ALGORITHM FOR CONSTRUCTION OF FUNCTIONAL TESTS FOR COMBINED LARGE-SCALE INTEGRATED CIRCUITS Abstract Only **c33**
A. G. Aleksenko, A. S. Karpov, and S. V. Rotnov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 95 Transl. into ENGLISH from Mikroelektron. (Moscow), v. 13, no. 2, Mar. - Apr. 1984 p 107-117 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

The need to choose an effective algorithm for construction of functional tests to be used in systems of input and output monitoring of large-scale integrated circuits (BIS) and super BIS is considered. It is found that the most promising algorithms for this purpose are based on the use of the apparatus of Boolean derivatives (ABD). The potential advantages of ABD are realized with the use of a highly efficient electronic computer of a new generation, equipped with associated parallel processes. The structure and small number of relatively simple ABD modules make it possible to develop an effective and available wide circle of specialists in the construction of functional tests for combined monitoring. E.A.K.

N85-13122# Joint Publications Research Service, Arlington, Va.
QUASI-THREE DIMENSIONAL MODELING OF FUNCTIONALLY-INTEGRATED ELEMENTS OF LARGE-SCALE INTEGRATED CIRCUITS Abstract Only **c33**
K. O. Petrosyants and A. I. Gurov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 96 Transl. into ENGLISH from Mikroelektron. (Moscow), v. 13, no. 2, Mar. - Apr. 1984 p 118-128 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

Functional integration allows a substantial reduction in the number of metallized connections and contact areas to the individual regions of a semiconductor structure, and realization of the basic connections between the elements within the semiconductor volume. Planning of a functionally integrated structure (FIS), which assures device parameters optimum for circuit engineering applications, is unthinkable without consideration of sufficient precise machine models. A series of models concerned with the special features of construction of FIS of various types was developed. A quasi-three dimensional model is presented of the functionally integrated elements of a bipolar BIS, which are multilayer semiconductor structures with an arbitrarily arranged diffused region and metallized contacts, controlled by a current or voltage. The model is described by a system of differential equations in partial derivatives of the elliptical type with integral limitations. A numerical algorithm uses a Newtonian procedure of quasilinearization in conjunction with a block method of upper relaxation. The model is realized in FORTRAN IV for a unified system of computers, intended to solve a wide range of problems which originate during planning of BIS, in particular choice of the optimum versions of topology, routes, and the electrical regime of the elements. E.A.K.

N85-13123# Joint Publications Research Service, Arlington, Va.
ANALYSIS OF DYNAMIC CHARACTERISTICS AND WAYS OF DEVELOPMENT OF BIPOLAR MAIN MEMORY WITH MINIATURIZATION OF INTEGRATED CIRCUIT ELEMENTS Abstract Only **c33**
A. G. Sergeyev, V. N. Savenkov, Yu. A. Parmenov, V. A. Neklyudov, and A. A. Mindeyeva *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 96-97 Transl. into ENGLISH from Mikroelektron. (Moscow), v. 13, no. 2, Mar. - Apr. 1984 p 129-137 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

A forecast estimate of the characteristics of a super large scale integrated circuit (super-BIS) memory as applied to bipolar main memory (OZU) circuits is presented. The limiting speed of bipolar OSU with $d < 2$ micrometer will be determined by the characteristics of the interconnections and not by the parameters of bipolar devices. With $d < 2$ micrometer, slowing down of the rate of growth of the response speed of OZU must be expected as the result of miniaturization as a consequence of the increase of the specific capacities of the p-n junctions and the metallization and constraint on the current density in the interconnections. The limitation and the specific properties of the energetics of bipolar OZU--localization of the current in separate lines; leads to a variance between speed of response and the decree of integration. For realization of the potentially high speed of response of bipolar OSU an improvement is necessary of the technology of the interconnections with the object of an increase of the current density to master a three layered system of interconnections. E.A.K.

N85-13124# Joint Publications Research Service, Arlington, Va.
PLANNING OF HYBRID INTEGRATED CIRCUITS FOR MICROWAVE-BAND OSCILLATORS Abstract Only **c33**
G. V. Petrov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 97 Transl. into ENGLISH from Mikroelektron. (Moscow), v. 13, no. 2, Mar. - Apr. 1984 p 138-147 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

An analytical method to calculate the hybrid integrated circuits (GIS) of microwave band oscillators based on field effect transistors with a Schottky gate (PTSh), which uses a transmission matrix of noise waves and parameters of the PTSh is presented. The following items are considered: (1) spreading and transmission matrices in large signal operation; (2) noise parameters of PTSh with feedback; (3) parameters of tuned circuit and matching network; (4) AM and FM noise of GIS oscillators; and (5) development of low noise GIS oscillators. The analysis made of microwave band GIS oscillators based on PTSh concluded that use of noise waves and noise parameters makes it possible to calculate the AM and FM noise of microwave band GIS oscillators and to forecast their behavior for PTSh with varied feedbacks. E.A.K.

N85-13125# Joint Publications Research Service, Arlington, Va.
PROPAGATION OF ACOUSTIC SHEAR WAVES THROUGH

ACTIVE PERIODIC STRUCTURE Abstract Only c71
A. A. Bulgakov and A. I. Timchenko *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 98 Transl. into ENGLISH from Akust. Zh. (Moscow), v. 30, no. 1, Jan. - Feb. 1984 p 23-27 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

Characteristics of transversely polarized acoustic vibrations in regular periodic piezosemiconductor structures with vacuum gaps between layers were analyzed, by use of the propagation of Gulayev-Bluestein surface shear waves as reference and assuming a drift of charge carriers along the semiconductor surfaces. The transfer matrix for a vacuum relates the tangential electric field components and the normal electric displacement components at the gap boundaries. The transfer matrix for a piezosemiconductor layer is based on a zero normal component of acoustic pressure on both sides of the layer, with continuity of the tangential electric field component and discontinuity of the normal electric displacement component. The resonance between symmetric and symmetric modes produces a suppression band characteristic of periodically laminate structures and the appearance of slot modes, but only at low charge carrier concentrations, with large velocity anisotropy and large buildup increment near resonance are some of the features. E.A.K.

N85-13126# Joint Publications Research Service, Arlington, Va.
USSR REPORT: MACHINE TOOLS AND METALWORKING EQUIPMENT
23 Nov. 1984 83 p Transl. into ENGLISH from various Russian articles
(JPRS-UMM-84-020) Avail: NTIS HC A05

Research and development and progress made in machine tools and metal working equipment is reported. Topics discussed include: industry planning and economics; metal cutting and metal forming machine tools; assembly lines and aggregated machining systems; robotics; and process controls and automation electronics. For individual titles, see N85-13127 through N85-13131.

N85-13127# Joint Publications Research Service, Arlington, Va.
DEVELOPMENTS IN SOVIET ROBOT TECHNOLOGY VIEWED c37
V. B. Alekseyev and L. M. Rudskiy *In its* USSR Rept.: Machine Tools and Metalworking Equipment (JPRS-UMM-84-020) 23 Nov. 1984 p 48-52 Transl. into ENGLISH from Stroit. i Dorozh. Mashiny (Moscow), no. 7, Jul. 1984 p 2-3 (For primary document see N85-13126 04-31)
Avail: NTIS HC A05

The development of the newest scientific, technical and industrial achievements in and introductional robots and robotized complexes are outlined. Tasks to reduce further manual labor and to workers employed in heavy and monotonous operations are discussed. The development of large scale use of highly effective systems of machines and operations that support the mechanization and automation of machine building work and reequipment are emphasized. Scientific and technical progress such as integrated mechanization and automation of production, heavy use of industrial robots, the introduction of flexible automated systems, the wide use of electronic equipment and the use of new structural materials are examined. E.A.K.

N85-13128# Joint Publications Research Service, Arlington, Va.
SOVIET ROBOT EXHIBITION REVIEWED c37
N. P. Oleynikova *In its* USSR Rept.: Machine Tools and Metalworking Equipment (JPRS-UMM-84-020) 23 Nov. 1984 p 53-56 Transl. into ENGLISH from Mashinostroitel (Moscow), no. 7, Jul. 1984 p 45-46 (For primary document see N85-13126 04-31)
Avail: NTIS HC A05

Industrial robots and robotics were presented. The different applications of automatic manipulators and robots such as purposes, specialization, kinematics, and basic parameters are outlined. E.A.K.

N85-13129# Joint Publications Research Service, Arlington, Va.
DEVELOPMENT, NEW APPLICATION OF SOVIET ROBOTS c37
B. A. Tyutin, L. V. Voroshnina, and L. V. Polosin *In its* USSR Rept.: Machine Tools and Metalworking Equipment (JPRS-UMM-84-020) 23 Nov. 1984 p 65-68 Transl. into ENGLISH from Tekhnol. i Organizatsiya Proizv. (Kiev), no. 3, Mar. 1984 p 19-21 (For primary document see N85-13126 04-31)
Avail: NTIS HC A05

The development of industrial robots (PR) which concentrate on machine building is discussed. The increase of the volume of PR to production facilities with difficult and unhealthy working conditions was considered. Domestic robot building has changed from a few experimental models to the industrial output of over 60 models. The possibilities of robot equipment is enumerated. The use of comprehensive PR increases the labor productivity, the shift coefficient of equipment and it improves the regularity and production standard. E.A.K.

N85-13130# Joint Publications Research Service, Arlington, Va.
DNC, CNC NETWORK FOR ROBOTIZED MACHINING CELLS c37
N. I. Dmitriyev, A. A. Yurchenkov, and P. P. Zuyev *In its* USSR Rept.: Machine Tools and Metalworking Equipment (JPRS-UMM-84-020) 23 Nov. 1984 p 71-74 Transl. into ENGLISH from Mekhaniz. i Avtomat. Proizv. (Moscow), no. 5, May 1984 p 5-6 (For primary document see N85-13126 04-31)
Avail: NTIS HC A05

The increase of labor productivity of machining in small series production is the automation of the technological processes by introducing technological robot complexes with NC machine tools. The increase in the NC machine tool park at the Minpribor enterprises, and the constantly increasing flow of past operations led to the necessity of direct control of machine tools. At present, the plants are equipped with NC systems that have a rigid structure with defined control functions, and with CNC systems that have a flexible, readjustable structure in which it is possible to reprogram the operating algorithms. It is necessary to have a type DNC control system to control NC systems by instructions received directly from the computer. E.A.K.

N85-13131# Joint Publications Research Service, Arlington, Va.
ADVANCES OF IMPLEMENTING NC MACHINE TOOLS DISCUSSED
Yu. P. Kukuyev and Ye. V. Trukhan *In its* USSR Rept.: Machine Tools and Metalworking Equipment (JPRS-UMM-84-020) 23 Nov. 1984 p 75-78 Transl. into ENGLISH from Mashinostroitel (Moscow), no. 7, Jul. 1984 p 12-13 (For primary document see N85-13126 04-31)
Avail: NTIS HC A05

Numerical control machine tools which are one of the principal resources of reequipment, mechanization and automation of small series and series production in machine building were examined. The continually increasing volume of NC machine tools which are produced and introduced is economically significant for introduction of these machine tools to operation and organization of their effective use. Organizational and technical measures were directed at solving these problems. To insure the fastest introduction of NC machine tools into operation and their technical maintenance, a number of setting up organizations was organized. Setting up services are also provided by the plants manufacturing the NC machine tools, and appropriate subdivisions are created for this purpose. E.A.K.

N85-13132# Joint Publications Research Service, Arlington, Va.
CHINA REPORT: SCIENCE AND TECHNOLOGY
2 Feb. 1984 48 p refs Transl. into ENGLISH from various Chinese articles
(JPRS-CST-84-003) Avail: NTIS HC A03/MF A01

Developments in the applied sciences and the life sciences in China are discussed. Gas centrifugation, robot technology, and optical fibers are among the specific topics considered. For individual titles, see N85-13133 through N85-13135.

N85-13133# Joint Publications Research Service, Arlington, Va.
MAGNETOHYDRODYNAMIC FLOW OF TWO-COMPONENT GAS ANALYZED c75
Rong Sheng *In its* China Rept.: Sci. and Technol. (JPRS-CST-84-003) 2 Feb. 1984 p 4-10 refs Transl. into ENGLISH from Lixue Xuebao (Beijing), no. 3, 1983 p 293-297 (For primary document see N85-13132 04-31)
Avail: NTIS HC A03/MF A01

A theoretical analysis is given of the flow of a two-component gas under the influence of radial and magnetic fields. The rotation speed, temperature distribution, and density ratio distribution are derived. The use of electromagnetic centrifugation for isotope separation is shown to achieve relatively high rotary speeds and rather large separation characteristics and yields. The limitations on rotary speed are also indicated. R.S.F.

N85-13134# Joint Publications Research Service, Arlington, Va.
DEVELOPMENT OF ROBOT TECHNOLOGY IN SHANGHAI SURVEYED c37
Lu Xueshi and Xu Huichang *In its* China Rept.: Sci. and Technol. (JPRS-CST-84-003) 2 Feb. 1984 p 11-23 Transl. into ENGLISH from Zuhe Jichuang (Dalian), no. 5, 1983 p 27-32 (For primary document see N85-13132 04-31)
Avail: NTIS HC A03/MF A01

The question of whether Chinese research in robot technology is premature or unwarranted is explored. Categories of robots are defined. Areas suitable for the development of robot technology are discussed. Problems in the use of robots in Shanghai are addressed. R.S.F.

N85-13135# Joint Publications Research Service, Arlington, Va.
NEW TELECOMMUNICATIONS OPTICAL FIBER DEVELOPED c32
In its China Rept.: Sci. and Technol. (JPRS-CST-84-003) 2 Feb. 1984 p 24-25 Transl. into ENGLISH from Xinhua (Beijing), 13 Jan. 1984 (For primary document see N85-13132 04-31)
Avail: NTIS HC A03/MF A01

A new optical fiber for experimental use in telecommunications was developed. In addition, a new polyurethane grouting material for use in dams was devised. Advances in metallurgy, geology, biology, and mathematics are also reported. R.S.F.

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N85-13136 Forschungsinstitut fuer Hochfrequenzphysik, Werthhoven (West Germany).
ANGLO-GERMAN MILLIMETER WAVE BACKSCATTER MEASUREMENTS ON SNOW, ENVIRONMENTAL DATA REPORT
H. Essen and H. Schimpf Jun. 1984 58 p refs
(Contract BMVg-FOA-T/RF31/81005/81302)
(Rept-7-84; Lfd-226) Copyright. Avail: Issuing Activity

Millimeter wave radar measurements were conducted to assess the reflection coefficient of snow covered terrain. Measurements were accompanied by an environmental characterization to investigate the relations between environmental factors, mostly features of the snow cover, and radar reflectivity. The meteorological measurements and the snow characterization are summarized. Instrumentation and data extraction are described. Author (ESA)

N85-13137# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
EQUIVOCATION LIMITS IN GAUSSIAN ADDITIVE CHANNELS [LIMITANTES DA EQUIVOCACAO EM CANAIS GAUSSIANOS ADITIVOS]
Max Henrique Machado Costa Jul. 1983 12 p refs in PORTUGUESE Presented at the 1st Simp. Brasilerio de Telecomunicacoes, Rio de Janeiro, 5-9 Sep. 1983
(INPE-2828-PRE/380) Avail: NTIS HC A02/MF A01

Equivocation in a Gaussian additive channel is defined as H(X/X +Z(subt)) or as the conditional entropy of X entry and X + Z (subt) exit of the channel. Equivocation is obviously a function of t power of additive Gaussian interference Z(subt). The upper and lower limits of equivocation as the function of interference power t are investigated. The lower limit passes the concavity of entropy power in the function of additional interference power. This limit has numerous uses in information theory: it permits establishment of the optimality of two extreme points of the general Gaussian interference channel. The upper limit is a consequence of the inequality of Shannon entropy power. This limit establishes the fact that the very rapid increase in equivocation is logarithmic. Transl. by B.G.

N85-13138# Committee on Science and Technology (U. S. House).
SCIENTIFIC COMMUNICATIONS AND NATIONAL SECURITY
Washington GPO 1984 186 p refs Hearing before the Subcomm. on Sci., Res. and Technol. and the Subcomm. on Invest. and Oversight of the Comm. on Sci. and Technol., 98th Congr., 2nd Sess., No. 100, 24 May 1984
(GPO-36-093) Avail: Subcommittee on Science, Research and Technology

Testimony is given regarding the conflict between the need for the free exchange of scientific information and the need for national security. Regulations and laws are discussed, as is the environment in which scientific innovation flourishes. R.J.F.

N85-13139*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
FIBER OPTIC DATA BUS USING FREQUENCY DIVISION MULTIPLEXING (FDM) AND AN ASYMMETRIC COUPLER
M. Zanger (City Univ. of N.Y., Bayside) and L. Webster Oct. 1984 15 p
(NASA-TM-86015; A-9870; NAS 1.15:86015) Avail: NTIS HC A02/MF A01 CSCL 17B

A fiber optic data bus, using frequency division multiplexing (FDM) is discussed. The use of FDM is motivated by the need to avoid central control of the bus operation. A major difficulty of such a data bus is introduced by the couplers. An efficient low loss access coupler with an asymmetric structure is presented, and manufacturing processes for the coupler are proposed. Author

N85-13140# Royal Signals and Radar Establishment, Malvern (England).
THE APPLICATION OF QUEUEING THEORY TO COMMUNICATIONS NETWORKS: A REVIEW
T. E. G. King Mar. 1984 51 p refs
(AD-A146680; RSRE-Memo-3666; BR92760) Avail: NTIS HC A04/MF A01 CSCL 17/2

The application of queueing theory to the performance analysis of store-and-forward communications networks is described. Basic definitions and results in probability theory are reviewed, and the Markov process is introduced. Applications of Markov and queueing theory to the study of networks and network components in equilibrium are illustrated, emphasizing the formulation of the mathematical model, rather than its solution. Author (ESA)

N85-13141# Aerospace Corp., El Segundo, Calif.
IMPEDANCE MEASUREMENTS ON A VLF MULTI-TURN LOOP ANTENNA IN A SPACE PLASMA SIMULATION CHAMBER
Harry C. Koons, Mitchell H. Dazey, and Bruce C. Edgar 15 Jun. 1984 23 p refs Sponsored in part by the Naval Air Systems Command
(Contract F04701-83-C-0084)
(AD-A145104; SD-TR-84-21; TR-0084(4723)-1) Avail: NTIS HC A02/MF A01 CSCL 20/14

An experiment to test a loop antenna configuration for a VLF transmitter in the ionosphere is being defined. The primary objectives of the experiment are to validate existing models for radiation by a loop antenna and to study the performance of the antenna in the ionospheric plasma. A one-third scale model of the antenna was constructed. Impedance was measured on the model in a 5-m diameter space plasma simulation chamber at NASA Lewis Research Center. The measurements confirm that the reactance of the antenna in an ionospheric plasma is essentially identical to its free space self inductance. The effective series resistance of the circuit increases with frequency. The losses are attributed to power transferred to plasma turbulence. Author

N85-13142# Stanford Linear Accelerator Center, Calif.
ELECTROMAGNETIC SHOWER DEVELOPMENT AND APPLICATIONS TO SAMPLING CALORIMETERS
Charles Y. Prescott Jul. 1984 21 p refs Presented at the 1st Workshop on Colliding Beam Phys., Beijing, China, 12-21 Jun. 1984
(Contract DE-AC03-76SF-00515)
(DE84-016355; SU-SLAC-PUB-3384; CONF-8406184-2) Avail: NTIS HC A02/MF A01

The application of electromagnetic theory to particle interactions represented one of the early successes in the study of particle interactions and fundamental forces. The description of electron properties, positron, and photon interactions led to applications in numerous experimental devices which are used in high energy experiments. Applications continue to evolve as new ideas are tried and new techniques become available. The underlying processes are reviewed. The application of electromagnetic calorimetry, some scaling laws and approximations that serve to guide designs of experimental devices, and examples where these principles are put to work are discussed. DOE

N85-13143# Department of Energy, Washington, D. C.
ELECTROMAGNETIC PULSE AND THE ELECTRIC POWER NETWORK
Kenneth W. Klein, Paul R. Barnes (ORNL, Tenn.), and Henry W. Zaininger (Zaininger Engineering Co., San Jose, Calif.) 1984 6 p refs Presented at the Power Eng. Soc. Summer Meeting, Seattle, 15 Jul. 1984
(Contracts DE-AC05-84OR-21400; W-7405-eng-26)
(DE84-015403; CONF-840706-3) Avail: NTIS HC A02/MF A01

The nuclear electromagnetic pulse (EMP) - electric power system interaction problem is defined. A description of high altitude EMP (HEMP) characteristics, source region EMP (SREMP) characteristics, and magnetohydrodynamics EMP (MHD-EMP) characteristics are presented. The results of initial calculations of EMP induced surges on electric power transmission and distribution lines are presented and compared with lightning induced surges. Potential EMP impacts on electric power systems are discussed, and an overview of the Department of Energy (DOE) EMP research program is presented. DOE

N85-13144# California Univ., Livermore. Lawrence Livermore Lab.
MICROWAVE MEASUREMENT OF THE COMPLEX DIELECTRIC TENSOR AT ANISOTROPIC SLAB MATERIALS
R. J. King, Y. H. Yen (Bell Communications Research, Inc., Holmdel, N.J.), and W. L. James (Forest Products Lab., Madison, Wis.) Aug. 1984 13 p refs Presented at a Rev. of Progr. in Quantitative NDE, La Jolla, Calif., 9-13 Jul. 1984
(Contract W-7405-eng-48)
(DE84-017050; UCRL-90649; CONF-840738-3) Avail: NTIS HC A02/MF A01

A linearly polarized electromagnetic wave incident on an anisotropic material suffers attenuation, phase change, and depolarization upon transmission through or reflection from the material. How the measured electrical properties of a wave transmitted through dimension lumber can be used to determine the complex dielectric tensor is demonstrated. The theory which applies equally to other lossy and anisotropic materials such as man-made composites having a 2 x 2 uniaxial tensor, is couched in terms of the measurable attenuation, phase change, and depolarization. A microwave system was developed for measuring these parameters. Results are given for extensive experiments conducted at 4.81 GHz on Douglas fir for moisture contents ranging from dry to complete saturation. The technique shows considerable promise as an accurate nondestructive diagnostic tool for evaluating the electrical, and hence, the physical and mechanical properties of semi-transparent anisotropic materials. DOE

N85-13145# California Univ., Livermore. Lawrence Livermore Lab.
FUNDAMENTAL LIMITATIONS IN ANTENNA RESOLUTION BY MAXIMUM ENTROPY METHODS
R. M. Bevensee Aug. 1984 17 p refs Presented at the 21st Intern. Union of Radio Sci. Gen. Assembly, Florence, 28 Aug. - 5 Sep. 1984
(Contract W-7405-eng-48)
(DE84-017052; UCRL-91423; CONF-840897-1) Avail: NTIS HC A02/MF A01

Work done during the past few years on antenna superresolution of distant radiating sources, both incoherent with and without additive noise and coherent with and without additive noise is summarized. DOE

N85-13146# France Cables sous Marine et de Radio, Paris.
TELEVISION TRANSMISSION IN FREQUENCY MODULATION [TRANSMISSION DE LA TELEVISION EN MODULATION DE FREQUENCE]
1984 16 p In FRENCH
Avail: NTIS HC A02/MF A01

The signal to noise ratios in frequency modulated television signals transmitted by a satellite are discussed. The parameters of the classical frequency modulation equations are defined. The noise characteristics are studied as a function of the available HF band and the noise to carrier power ratio. The results for the case of INTELSAT with 4.2 and 6 MHz video signals are presented. The threshold of the sound demodulation in the case of double frequency modulation is also discussed and the numerical results for INTELSAT are given. Author (ESA)

N85-13147# France Cables sous Marine et de Radio, Paris.
THE TELECOM 1 SATELLITE TELECOMMUNICATION SYSTEM [SYSTEME DE TELECOMMUNICATIONS PAR SATELLITE TELECOM 1]
1984 13 p In FRENCH
Avail: NTIS HC A02/MF A01

System characteristics are summarized to provide a reference guide for the users of the Telecom 1 system. Services, vehicles, stations, launching facilities, industrial organization, technical characteristics, mission characteristics, packet switching parameters and time division multiple access characteristics are described. Author (ESA)

N85-13148# France Cables sous Marine et de Radio, Paris.
METHODOLOGY FOR THE IMPLEMENTATION OF A DOMESTIC SATELLITE COMMUNICATIONS NETWORK
12 Jul. 1984 46 p
Avail: NTIS HC A03/MF A01

Satellite communication network project organization, task sequencing and a typical schedule are presented. The project is divided into feasibility study, system definition, and system implementation. The basic data include traffic estimates, present national network status, master plan, available space segment characteristics, satellite transmission state of the art and environmental conditions of future Earth stations. Author (ESA)

N85-13149# European Space Agency, Paris (France).
CARRIER ACQUISITION AND TRACKING BY A COSTAS LOOP WITH AUTOMATIC FREQUENCY CONTROL
Ernst Messerschmid Apr. 1984 59 p Transl. into ENGLISH of "Akquisitions-U. Trackingverhalten einer COSTAS-Regelschleif mit automatischer Frequenzregelung" DFVLR-FB-83-24, DFVLR, Oberpfaffenhofen, West Ger., Oct. 1983 Report previously announced as N84-17202
(ESA-TT-838; DFVLR-FB-83-24) Avail: NTIS HC A04/MF A01; original German version available from DFVLR, Cologne DM 11

Signal reconstruction for demodulation from the BPSK-modulated suppressed carrier by COSTAS demodulation is discussed. For heavily faded mobile communications such as satellite-aided mobile communication, carrier acquisition lasts too long for most applications, and for a large frequency uncertainty range, false carrier locking leads to an erroneous demodulation. Both disadvantages can be avoided by an automatic frequency control (AFC) inserted into the COSTAS loop. The AFC characteristics for BPSK-modulated NRZ signals, and the corresponding acquisition times, are derived for passive low pass filters. The signal tracking of the composite COSTAS/AFC loop is analyzed. Author (ESA)

N85-13150# European Space Agency, Paris (France).
APOLLO SYSTEM REQUIREMENTS SPECIFICATION
B. Battrick, ed. Aug. 1984 38 p refs
(ESA-SP-1068; EUR-9413-EN; ISSN-0379-6566) Avail: NTIS HC A03/MF A01

The APOLLO electronic document delivery system general requirements (encryption, monitoring, data communication protocols, interfaces) and satellite communication system requirements (information rate, channel quality, traffic unit, number of simultaneously active ground stations, satellite access time, data message structure, size and retransmission) are outlined. System elements, the satellite network, protocol-dependent message exchanges, and data-station interface requirements are described. The maintenance alarm concept is introduced. Author (ESA)

N85-13151# European Space Agency. European Space Research and Technology Center, ESTEC, Noordwijk (Netherlands).
A TRANSMISSION ANALYSIS FOR THE USE OF 2-4 PSK MODULATION IN SATELLITE BROADCASTING
R. A. Harris (ESTEC , Noordwijk, Netherlands), L. Erup (ESTEC, Noordwijk, Netherlands), and P. Kristiansen (ESTEC, Noordwijk Netherlands) Aug. 1984 130 p refs
(ESA-STM-231; ISSN-0379-4075) Avail: NTIS HC A07/MF A01

Computer simulation studies of differentially coherent and coherent demodulation of 2-4 PSK for direct satellite broadcasting are described. The simulation models include multiple-filtering and nonlinear amplification, but do not take into account synchronization of the burst-mode digital sound interleaved with the analog video signal. Low performance degradations are obtained for coherent and differentially coherent demodulation, when simple (Butterworth and Gaussian) receiver filter types are used. The optimum receiver filter bandwidth depends on the type of filter and the type of demodulator. Adjacent-channel interference; the effects of linear gain and group-delay distortions; and carrier frequency errors at the input to the differentially coherent demodulator are discussed. Author (ESA)

N85-13152# Research Inst. of National Defence, Linkoeping (Sweden).
DIGITAL RADIO LINK: WAVE PROPAGATION MEASUREMENTS USING NARROW BAND TECHNIQUE
Stellan Nilsson and Lars Ladell Aug. 1984 39 p refs In SWEDISH; ENGLISH summary
(FOA-C-30364-E2; ISSN-0347-3708) Avail: NTIS HC A03/MF A01; Research Institute for National Defence, Stockholm KR 50

Measurements on a 34 M Bit, 7 GHz digital radio link with a linkhop of 56 km are described. Events with flat and frequency selective fading are presented and a method using narrow band measurements to evaluate frequency selective fading is outlined. By making narrow band (125 kHz) measurements on 3 frequencies (-10, 0, +10 MHz, relevant to a center frequency of 70 MHz), the parameters for a 2-way model of wave propagation were evaluated in terms of delay and amplitude. Author (ESA)

N85-13153# Research Inst. of National Defence, Linkoeping (Sweden).
DIGITAL IMAGE PROCESSING; REPORT FROM A CONFERENCE AND STUDY TRIP TO THE USA AND CANADA, SUMMER 1984
Gunilla Borgefors Sep. 1984 34 p refs In SWEDISH; ENGLISH summary
(FOA-C-30369-E1; ISSN-0347-3708) Avail: NTIS HC A03/MF A01; Research Institute for National Defence, Stockholm KR 50

Geographic information systems and mapping; structures for image processing; artificial intelligence; aids and robots for developing three-dimensional images; biological vision and computerized detection; stereomatching, pattern recognition, and character recognition; and data storage are discussed. Author (ESA)

N85-13154# Societe Nationale Industrielle Aerospatiale, Les Mureaux (France). Service S/DE/S.
TESTS FOR SUSCEPTIBILITY TO ELECTROMAGNETIC ATTACK [ESSAIS DE SUSCEPTIBILITE A UNE AGRESSION ELECTROMAGNETIQUE]
Claude Federici 1984 11 p In FRENCH Presented at Journees SEE, Grenoble, France, 9-11 May 1984
(SNIAS-842-422-101) Avail: NTIS HC A02/MF A01

Tests in which the required electromagnetic interference levels are directly injected in the tested circuits through, for example, magnetic coupling are described. The goal is the determination of thresholds at which the system in incapable of functioning normally. Typical test procedures and test equipment are described. Author (ESA)

N85-13096# Joint Publications Research Service, Arlington, Va.
BRAGG REFLECTION OF SURFACE ELECTROACOUSTIC SHEAR WAVES Abstract Only
Yu. V. Gulyayev, T. N. Kurach, V. P. Plesskiy, and V. P. Tereshkov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 1 Transl. into ENGLISH from Akust. Zh. (Moscow), v. 30, no. 1, Jan. - Feb. 1984 p 47-50 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13098# Joint Publications Research Service, Arlington, Va.
PROBABILITY DISTRIBUTION DENSITY OF NORMALIZED RADAR RANGE Abstract Only
V. A. Melititskiy, N. S. Akinshin, and A. V. Mikhaylov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 4-5 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 2, Feb. 1984 p 26-29 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13099# Joint Publications Research Service, Arlington, Va.
REGENERATORS OF BINARY PULSES FOR OPTICAL COMMUNICATION SYSTEMS Abstract Only
O. N. Porokhov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 8 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 2, Feb. 1984 p 3-8 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13100# Joint Publications Research Service, Arlington, Va.
INTERFERENCE IMMUNITY OF DIGITAL EQUIPMENT FOR COHERENT PROCESSING OF WIDEBAND SIGNALS Abstract Only
A. V. Obraztsov and V. V. Ignatov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 19-20 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 3, Mar. 1984 p 30-34 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13101# Joint Publications Research Service, Arlington, Va.
DIGITAL RADIO RECEIVERS AND PROBLEMS OF ANALOG-TO-DIGITAL CONVERSION OF NARROW-BAND SIGNALS Abstract Only
Ye. S. Poberezhskiy *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 20 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 3, Mar. 1984 p 56-63 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13135# Joint Publications Research Service, Arlington, Va.
NEW TELECOMMUNICATIONS OPTICAL FIBER DEVELOPED

In its China Rept.: Sci. and Technol. (JPRS-CST-84-003) 2 Feb. 1984 p 24-25 Transl. into ENGLISH from Xinhua (Beijing), 13 Jan. 1984 (For primary document see N85-13132 04-31)
Avail: NTIS HC A03/MF A01

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics*.

N85-13155 Royal Signals and Radar Establishment, Malvern (England).
IMPLEMENTING WAVEGUIDE BANDWIDTH SIX-PORT REFLECTOMETER CIRCUITS AT MILLIMETRIC WAVELENGTHS
L. D. Hill May 1984 17 p refs
(RSRE-Memo-3678; BR92490) Copyright. Avail: NTIS HC A02/MF A01

The implementation of two WG22 six-port reflectometer circuits for the measurement of complex voltage reflection coefficients is described. The phase compensation required to enable these two six-port circuits to operate over the 26.5 to 40 GHz band, using commercially available directional couplers, is outlined. An automated WG22 six-port reflectometer operated at 0.5 GHz intervals over the full waveguide bandwidth is reported. To implement these circuits in other millimetric bands, the directional couplers need a nominal directivity of 30 dB and the coupled/transmitted phase relationship should track with frequency within 15 deg over the whole waveguide band. Author (ESA)

N85-13156*# National Aeronautics and Space Administration, Washington, D. C.
PROCEDURES FOR PRECAP VISUAL INSPECTION
1984 81 p refs
(NASA-RP-1122; NAS 1.61:1122) Avail: NTIS HC A05/MF A01 CSCL 09C

Screening procedures for the final precap visual inspection of microcircuits used in electronic system components are described as an aid in training personnel unfamiliar with microcircuits. Processing techniques used in industry for the manufacture of monolithic and hybrid components are presented and imperfections that may be encountered during this inspection are discussed. Problem areas such as scratches, voids, adhesions, and wire bonding are illustrated by photomicrographs. This guide can serve as an effective tool in training personnel to perform precap visual inspections efficiently and reliably. Author

N85-13157*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CONTROL ASPECTS OF THE SCHUCHULI VILLAGE STAND-ALONE PHOTOVOLTAIC POWER SYSTEM Final Report
Peter P. Groumpos (Cleveland State Univ., Ohio), James E. Culler (Cleveland State Univ., Ohio), and Richard DeLombard Nov. 1984 31 p refs
(Contract DE-AI01-79ET-20485)
(NASA-TM-83790; DOE/NASA/20485-17; E-2286; NAS 1.15:83790) Avail: NTIS HC A03/MF A01 CSCL 09B

A photovoltaic power system in an Arizona Indian village was installed. The control subsystem of this photovoltaic power system was analyzed. The four major functions of the control subsystem are: (1) voltage regulation; (2) load management; (3) water pump control; and (4) system protection. The control subsystem functions flowcharts for the control subsystem operation, and a computer program that models the control subsystem are presented. E.A.K.

N85-13158# Pennsylvania Univ., Philadelphia. Dept. of Material Science and Engineering.
ELECTROCHEMICAL INVESTIGATIONS OF NOVEL ELECTRODE MATERIALS Final Report, 1 Aug. 1977 - 31 Dec. 1983
W. L. Worrell Jun. 1984 6 p
(Contract DE-AC02-77ER-04356)
(DE84-014352; DOE/ER-04356/6) Avail: NTIS HC A02/MF A01

The structural, thermodynamic and transport properties of the lithium and sodium intercalated disulfides were investigated. Electrochemical cell techniques were used to determine the compositional variation of the chemical potential and diffusivity of lithium and sodium in TiS2 and TaS2. A thermodynamic approach was used to model the compositional variation of the alkali-metal chemical potential in the intercalated compounds. Using this model, the magnitude of the repulsive interaction energy between intercalated atoms can be estimated. A model which predicts the observed compositional variation of the alkali-metal chemical diffusivity in intercalated compounds was also derived. The chemical diffusivity model is in good agreement with the experimental results for the Na/sub x/TaS2 and Na/sub x/TiS2 systems. Two types of multinary intercalation compounds were investigated. Phase relationships and lithium chemical potentials in the cointercalated Li/sub x/Na/sub y/TiS2, Li/sub x/K/sub y/TiS2 and Li/sub x/Ca/sub y/TiS2 systems were determined. The studies increased the understanding of the significance of ionic size and charge of a second intercalant upon the structure, phase stability and electrochemical properties of Li/sub x/A/sub y/TiS2 compounds. DOE

N85-13159# Los Alamos Scientific Lab., N. Mex.
MECHANISMS OF ELECTRICAL CONDUCTIVITY IN OLIVINE
Robert N. Schock, Alfred G. Duba, and Thomas J. Shankland (Los Alamos Sci. Lab., N. Mex.) 29 Aug. 1984 13 p refs Presented at the 27th Intern. Geolog. Congr., Moscow, 4-14 Aug. 1984
(Contracts W-7405-eng-48; W-7405-eng-36)
(DE84-014333; UCRL-89788; CONF-840820-2) Avail: NTIS HC A02/MF A01

Data on the electrical conductivity and the thermoelectric effect in single crystals indicate that the charge conduction mechanism in pure magnesium forsterite is electrons. The concentration of electrons is varied by controlling the number of oxygen vacancies through manipulation of the oxygen pressure. For iron bearing olivine, the conduction mechanism is by electron holes localized on an iron ion. Since iron strongly affects the creep process as well, oxidation of iron is probably accompanied by the production of magnesium vacancies. DOE

N85-13160# Johnson Controls, Inc., Milwaukee, Wis. Corporate Applied Research.
PERFORMANCE OF IMPROVED LEAD ACID BATTERIES FOR ELECTRIC VEHICLES
K. R. Bullock, B. K. Mahato, G. H. Brilmyer, and G. L. Wierschem 1984 16 p refs Presented at the Fall Meeting of the Electrochem. Soc., New Orleans, 7 Oct. 1984
(Contract W-31-109-eng-38)
(DE84-015845; CONF-841058-8) Avail: NTIS HC A02/MF A01

New applications for lead acid batteries, such as electric vehicle propulsion, demand high specific energy and power and good cycle life. A research and development program has been underway since 1978 to develop advanced electric vehicle batteries. Cell test results on two Improved State of the Art battery designs developed under this program are described. Capacities and material utilization are shown as a function of both discharge rate and temperature. Cycle life data at 80 and 10% depth of discharge are presented and failure modes are discussed. DOE

N85-13161*# Brookhaven National Lab., Upton, N. Y. Dept. of Applied Sciences.
PROPERTIES OF CATHODE MATERIALS IN ALKALINE CELLS
A. J. Salkind (Rutgers Univ., New Brunswick, N.J.), J. McBreen, R. Freeman (Rutgers Univ., New Brunswick, N.J.), and W. A. Parkhurst (Naval Surface Weapons Center, White Oak, Md.) Apr. 1984 17 p refs Presented at the 14th Intern. Power Sources Symp., Brighton, England, 17-21 Sep. 1984 Submitted for publication

(Contract DE-AC02-76CH-00016)
(NASA-CR-174082; NAS 1.26:174082; DE84-014391; BNL-34724; CONF-840933-1) Avail: NTIS HC A02/MF A01

Conventional and new cathode materials in primary and secondary alkaline cells were investigated for stability, structure, electrochemical reversibility and efficiency. Included were various forms of AgO for reserve type silver zinc batteries, a new material - AgNiO2 and several nickel electrodes for nickel cadmium and nickel hydrogen cells for aerospace applications. A comparative study was made of the stability of electroformed and chemically prepared AgO. Stability was correlated with impurities. After the first discharge AgNiO2 can be recharged to the monovalent level. The discharge product is predominantly silver. Plastic bonded nickel electrodes display a second plateau on discharge. Additions of Co(OH)2 largely eliminate this. DOE

N85-13162# Los Alamos Scientific Lab., N. Mex.
DESIGN, CONSTRUCTION, AND OPERATIONAL RESULTS OF AN 800-A, 10-KV HOT DECK AMPLIFIER
William A. Reass 1984 9 p Presented at the 16th Power Modulator Symp., Arlington, Va., 17 Jun. 1984
(Contract W-7405-eng-36)
(DE84-014044; LA-UR-84-1938; CONF-8406137-11) Avail: NTIS HC A02/MF A01

This paper describes the electrical design, implementation, and operational results of a high fidelity (feedback regulated) 800 A, 10-kV hard tube, hot deck amplifier. The amplifier can produce any linear waveform to 800-A for 30 ms and beyond (depending on main energy storage). The present use is to drive the vertical field (VF) control windings on ZT-40M, a toroidal reversed field pinch plasma physics experiments. Although our application requires only 10 kV (8 MW) of switching, anode voltage may be as high as 40 kV (32 MW). DOE

N85-13163# Los Alamos Scientific Lab., N. Mex.
MAGNETIC AND PHOTOCONDUCTIVE REPETITIVE RAIL-GUN OPENING SWITCHES
W. C. Nunnally Jul. 1984 11 p refs
(Contract W-7405-eng-36)
(DE84-017060; LA-9940-MS) Avail: NTIS HC A02/MF A01

This report investigates the use of a transformer with a saturable ferromagnetic core and a photoconductive element as a possible opening switch for a repetitive rail gun. A basic rail gun is first analyzed to determine the voltage, current, and power requirements for the switch. Then, each switch concept is analyzed to determine the characteristic size and operating parameters necessary to operate in the rail-gun system. The analysis is used to determine concept feasibility. DOE

N85-13164# Los Alamos Scientific Lab., N. Mex.
STARK BROADENING OF H(-) RESONANCES IN LARGE ELECTRIC FIELDS Thesis - New Mexico Univ.
Kenneth B. Butterfield 1984 165 p refs
(Contract W-7405-eng-36)
(DE84-016974; LA-10149-T) Avail: NTIS HC A08/MF A01

Resonances in the H(-) ion near the n=2 energy of H(0) were studied in very large electric fields. Third harmonic photons (3.5 eV) from a Nd:YAG laser were Doppler tuned to produce the 11 eV photons required to excite the resonances. A magnetic field perpendicular to the H(-) velocity appeared via the Lorentz transformation as a very large electric field in the center of mass frame of reference. The magnetic fields were produced by a pulsed power supply driving a Helmholtz coil. The maximum field used (3 MV/cm) was sufficient to field ionize enough of the H(-) beam, within the 1.5 cm high field region, to saturate the detectors. The onset of field ionization was observed to be at 2.5 MV/cm. The (1)P(0) shape resonance and (1)D/sup e/ resonance were not quenched by the largest fields used. Cross sections for these resonances were measured at several lesser fields, and widths, centroid energies, and strengths for each resonance were determined. The cross section for producing H(0) (n=2) was measured for the first time and was shown that the Fano function is inadequate to describe the shape resonance. DOE

N85-13165# California Univ., Berkeley. Lawrence Berkeley Lab. Engineering and Technical Services Div.
PRELIMINARY EVALUATION OF RCA C83036E PROTOTYPE PHOTOMULTIPLIER
C. C. Lo and B. Leskovar 1984 10 p refs Presented at the IEEE Conf, Orlando, Fla., 31 Oct. - 2 Nov. 1984
(Contract DE-AC03-76SF-00098)
(DE84-016894; LBL-17378; CONF-841008-1) Avail: NTIS HC A02/MF A01

Characteristics of the prototype RCA C83036E 52 mm diameter photomultiplier were measured. The results of the measurements of the gain, dark current, photocathode quantum efficiency, peak output current, electron transit time, and output pulse rise time as a function of voltage between anode and cathode are given. Single photoelectron time spread, multiphotoelectron time resolution, pulse height spectrum and afterpulse time spectrum are discussed. DOE

N85-13166# Centre National d'Etudes Spatiales, Toulouse (France). Dept. de Fiabilite-Technologie.
METAL OXIDE SEMICONDUCTORS POWER TRANSISTORS [LES TRANSISTORS MOS DE PUISSANCE]
Bernard Cluzel 10 May 1984 25 p refs In FRENCH
(CNES-84/QPE/FT/190) Avail: NTIS HC A02/MF A01

Production technologies for MOS power transistor are described. The characteristics of MOS power and bipolar transistors are evaluated. The equivalent electrical circuits are analyzed. Sensibility to space environment radiation is discussed. The advantages of a cascade combination of MOS-bipolar transistor are shown. It is estimated that 30% of the demand for power transistors demand will be met by MOS transistors by 1987. Author (ESA)

N85-13167# Centre National d'Etudes Spatiales, Toulouse (France). Centre Spatial.
SIMULATION OF A TRANSMISSION CIRCUIT COMPOSED OF SLIGHTLY NONLINEAR ELEMENTS. COMPUTATION OF THE INTERMODULATION ON SIGNALS COMPOSED OF N CARRIERS [SIMULATION D'UNE CHAINE DE TRANSMISSION A ELEMENTS FAIBLEMENT NON LINEAIRES. CALCULS DES PRODUITS D'INTERMODULATION SUR UN SIGNAL COMPOSE DE N PORTEUSES]
Jean-Luc Sedard and Luc Lapierre Oct. 1982 51 p refs In FRENCH; ENGLISH summary
(CNES-NT-105) Avail: NTIS HC A04/MF A01

The effects associated with component nonlinearity in a circuit composed of filters, amplifiers and mixers are characterized. A computer program for the computation of the third order intermodulation products, the signal compression, and the corresponding C/I ratio of a multicarrier input signal is described. These nonlinearities are determined by the third order intercept point and gain (or conversion loss). Author (ESA)

N85-13168# Centre National d'Etudes Spatiales, Toulouse (France). Centre Spatial.
COMPUTERIZED CIRCUIT DESIGNS: REALIZATION OF MASKS TO MANUFACTURE MICROWAVE CIRCUITS [CONCEPTION DE CIRCUITS ASSISTEE PAR ORDINATEUR: REALISATION DE MASQUES POUR L'ELABORATION DE CIRCUITS MICROONDES]
Jean-Luc Sedard and Luc Lapierre Aug. 1983 82 p In FRENCH; ENGLISH summary
(CNES-NT-107) Avail: NTIS HC A05/MF A01

A computer and its graphical peripherals (cathode tracer COM 330) were used to produce directly a full scale printed circuit mask on 35 mm film. High precision equipment is not essential, since circuit parameters are required with an accuracy far lower than that of the apparatus used to produce the mask. The production and control by the definition tests (line width, spacing); the trace program versus user data; applications and examples, and visualization procedures are discussed. Author (ESA)

N85-13169# Centre National d'Etudes Spatiales, Toulouse (France). Centre Spatial.

ELECTRONIC COMPONENTS FOR SPACE APPLICATIONS [LES COMPOSANTS ELECTRONICS POUR APPLICATIONS SPATIALES]

Francois Linder Sep. 1983 78 p In FRENCH; ENGLISH summary
(CNES-NT-109) Avail: NTIS HC A05/MF A01

Procedures to obtain high reliability components are described, including choice of component and manufacturer, quality level, procurement procedures, selection criteria, and fault analysis. Author (ESA)

N85-13170# AEG-Telefunken, Wedel (West Germany). Fachbereich Neue Technologien, Raumfahrt.

QUALIFICATION OF A THICK FILM HYBRID Final Report, Nov. 1980

Hans-Dieter Stolp Bonn Bundesministerium fuer Forschung und Technologie Jun. 1984 27 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-84-024; ISSN-0170-1339) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 5.50

Space qualification of a complete family of hybrids for satellite power supplies is discussed. The space qualification for a thick film hybrid comparator stage with adjustable time delay was examined. The qualification allows to use this hybrid for satellite power supplies. Circuitry selection and qualification procedure are described. Author (ESA)

N85-13171# Research Inst. of National Defence, Linkoeping (Sweden).

PULSE INJECTION ON A POWER CABLE PENETRATING A SHIELDING WALL BY FEED-THROUGH CAPACITORS

Sven Garmland, Torbjoern Karlsson, and Goeran Unden Sep. 1984 40 p refs In SWEDISH; ENGLISH summary
(FOA-C-30372-A3; ISSN-0347-3708) Avail: NTIS HC A03/MF A01

Pulses, similar to those induced by an electromagnetic pulse field, were injected into a power cable penetrating a shielding wall equipped with feed-through capacitors. The transient suppression efficiency was determined by measuring the pulse on both sides of two different capacitors. Measured voltage agrees with calculated residual voltage, supposing ideal filter characteristics. Feed-through capacitors are demonstrated to have a unique capability of eliminating effectively the high frequency coupling between unprotected and protected space. Protected against slowly rising overvoltage by surge arresters, feed-through capacitors are recommended for protection of power installations. Author (ESA)

N85-13172# Societe Nationale Industrielle Aerospatiale, Les Mureaux (France). Div. Systemes Balistiques et Spatiaux.

IMPROVEMENT OF LIGHTNING ARRESTERS ENERGY CAPABILITY

B. Trannois 1984 5 p refs Presented at EMC 84, Tokyo, 16-18 Oct. 1984
(SNIAS-842-422-104) Avail: NTIS HC A02/MF A01

A very fast circuit shorter for high current levels was developed. Time to short circuit is < 3 msec; short circuit current characteristics is $>$ 100 KA peak current (160 KA maximum value); overheating characteristics during 100 msec $>$ 30 KA (64 KA maximum value); service voltage up to 1400 V RMS; and dielectric insulation up to 3800 V. It is not a substitute for surge arresters, since it is not designed for high voltages. An arrester with microsec response ensures the voltage control of the line, and drives to ground the immediate part of the current, then the circuit shorter can work within a low voltage environment, and drive to ground the major (in term of Coulombs) part of the current, and prevent degradation to the surge arrester. Where a permanent power service is wanted, this device can be completed with a self opening of circuit shorter with a time delay to prevent the operation of circuit breakers. Author (ESA)

N85-13173# National Bureau of Standards, Washington, D.C. Electrosystems Div.

DEVELOPMENT OF POWER SYSTEM MANAGEMENT Quarterly Report, 1 Apr. - 30 Jun. 1983

R. E. Hebner Feb. 1984 42 p refs Sponsored by DOE
(PB84-216530; NBSIR-84-2809) Avail: NTIS HC A03/MF A01 CSCL 09A

Progress on five technical investigations sponsored by the DOE is reported. The calibration of instruments designed to measure the 60-Hz electric field in biological exposure facilities is discussed along with the effect of water on SF6 corona discharges. In addition, the measurement of failure mechanisms in liquid/solid and gas/solid insulating systems is considered. Finally, the development and behavior of active insulators are addressed. R.S.F.

N85-13174# National Bureau of Standards, Washington, D.C. Semiconductor Devices and Circuits Div.

NMOS TEST CHIP FOR A COURSE IN SEMICONDUCTOR PARAMETER MEASUREMENTS

K. P. Roenker (Cincinnati Univ.) and L. W. Linholm Apr. 1984 50 p refs
(PB84-216506; NBSIR-84-2822) Avail: NTIS HC A03/MF A01 CSCL 09E

This report describes an NMOS test chip, NBS-40, which was developed to be used in graduate level electronics engineering courses involving semiconductor parameter measurements associated with the fabrication of integrated circuits. The 35 test structures included in the test chip and their use in materials, device, and process parameter measurements are described. Details of the silicon gate NMOS process used in the chip fabrication are also provided. Author (GRA)

N85-13077# Hokkaido Univ., Sapporo (Japan). Dept. of Metallurgical Engineering.

DETERMINATION OF FARADAIC CURRENT THROUGH A BIPOLAR ELECTRODE IN ACIDIC BICHROMATE

Takeshi Sasaki and Tatsuo Ishikawa *In its* Bull. of the Fac. of Eng., Hokkaido Univ., No. 123. Oct. 1984 p 15-26 refs In JAPANESE; ENGLISH summary (For primary document see N85-13075 04-31)
Avail: NTIS HC A05/MF A01

N85-13102# Joint Publications Research Service, Arlington, Va.

BRIDGE EROSION IN ELECTRICAL CONTACTS Abstract Only

Zoya Vladimirovna Shabanova and Sergey Aleksandrovich Nekrasov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 47 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved.: Elektromekhan. (Novocherkassk), no. 2, Feb. 1984 p 71-77 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13107# Joint Publications Research Service, Arlington, Va.

GLOW SPOTS AND BREAKDOWN IN GaAs TRANSISTOR STRUCTURE Abstract Only

B. S. Kerner, N. A. Kozlov, A. M. Nechayev, and V. F. Sinkevich *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 58 Transl. into ENGLISH from Fiz. i Tekhn. Poluprov. (Leningrad), v. 17, no. 11, Nov. 1983 p 1931-1934 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13117# Joint Publications Research Service, Arlington, Va.

SUPERCONDUCTING MAGNET FOR PROBING EDDY CURRENTS IN DYNAMIC MODELS Abstract Only

Oleg Ionovich Gorskiy, Viktor Aleksandrovich Dzenzerskiy, and Valeriy Yurevich Vorovskiy *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 85 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved.: Elektromekhan. (Novocherkassk), no. 2, Feb. 1984 p 92-94 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13118# Joint Publications Research Service, Arlington, Va.
OPTIMUM DIMENSIONS OF POWER SOLENOIDS FOR MAGNETIC SUSPENSION Abstract Only
Boris Aleksandrovich Kaznacheyev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 86 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved.: Elektromekhan. (Novocherkassk), no. 2, Feb. 1984 p 94-96 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13119# Joint Publications Research Service, Arlington, Va.
ANALYSIS OF FREQUENCY-SELECTIVE INTEGRATED CIRCUITS IN SYSTEM OF NORMAL COORDINATES Abstract Only
P. A. Arutyunov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 94 Transl. into ENGLISH from Mikroelektron. (Moscow), v. 12, no. 6, Nov. - Dec. 1983 p 540-547 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13120# Joint Publications Research Service, Arlington, Va.
MACHINE COMPUTATION OF DELAY AND CAPACITANCE OF TRANSISTOR STRUCTURES OF SUBNANOSECOND LARGE INTEGRATED CIRCUITS Abstract Only
A. N. Bubennikov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 95 Transl. into ENGLISH from Mikroelektron. (Moscow), v. 12, no. 6, Nov. - Dec. 1983 p 548-560 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13121# Joint Publications Research Service, Arlington, Va.
COMPARISON ANALYSIS OF ALGORITHM FOR CONSTRUCTION OF FUNCTIONAL TESTS FOR COMBINED LARGE-SCALE INTEGRATED CIRCUITS Abstract Only
A. G. Aleksenko, A. S. Karpov, and S. V. Rotnov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 95 Transl. into ENGLISH from Mikroelektron. (Moscow), v. 13, no. 2, Mar. - Apr. 1984 p 107-117 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13122# Joint Publications Research Service, Arlington, Va.
QUASI-THREE DIMENSIONAL MODELING OF FUNCTIONALLY-INTEGRATED ELEMENTS OF LARGE-SCALE INTEGRATED CIRCUITS Abstract Only
K. O. Petrosyants and A. I. Gurov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 96 Transl. into ENGLISH from Mikroelektron. (Moscow), v. 13, no. 2, Mar. - Apr. 1984 p 118-128 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13123# Joint Publications Research Service, Arlington, Va.
ANALYSIS OF DYNAMIC CHARACTERISTICS AND WAYS OF DEVELOPMENT OF BIPOLAR MAIN MEMORY WITH MINIATURIZATION OF INTEGRATED CIRCUIT ELEMENTS Abstract Only
A. G. Sergeyev, V. N. Savenkov, Yu. A. Parmenov, V. A. Neklyudov, and A. A. Mindeyeva *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 96-97 Transl. into ENGLISH from Mikroelektron. (Moscow), v. 13, no. 2, Mar. - Apr. 1984 p 129-137 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13124# Joint Publications Research Service, Arlington, Va.
PLANNING OF HYBRID INTEGRATED CIRCUITS FOR MICROWAVE-BAND OSCILLATORS Abstract Only
G. V. Petrov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 97 Transl. into ENGLISH from Mikroelektron. (Moscow), v. 13, no. 2, Mar. - Apr. 1984 p 138-147 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

N85-13175*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
A PRELIMINARY STUDY OF NUMERICAL SIMULATION OF THERMOSOLUTAL CONVECTION OF INTEREST TO CRYSTAL GROWTH
Timothy L. Miller Nov. 1984 33 p refs
(NASA-TP-2394; NAS 1.60:2394) Avail: NTIS HC A03/MF A01 CSCL 20D

Calculations were performed with computer models using three types of finite difference methods of thermosolutal convection: horizontal heating of a container filled with a stably stratified solution, finger convection in a container, and finger convection in a horizontally infinite channel. The importance of including thermosolutal convection in models of crystal growth is emphasized, and the difficulties in doing so are demonstrated. It is pointed out that these difficulties, due primarily to the fine structure of the convection, may be partly overcome by the use of fine grids and implicit time stepping methods. Author

N85-13176*# National Aeronautics and Space Administration, Washington, D. C.
TURBULENT BOUNDARY LAYERS WITH SECONDARY FLOW
E. Grushwitz Jul. 1984 19 p Transl. into ENGLISH from Ing.-Arch. (West Germany), v. 6, 1935 p 355-365 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-77494; NAS 1.15:77494) Avail: NTIS HC A02/MF A01 CSCL 20D

An experimental analysis of the boundary layer on a plane wall, along which the flow occurs, whose potential flow lines are curved in plane parallel to the wall is discussed. According to the equation frequently applied to boundary layers in a plane flow, which is usually obtained by using the pulse law, a generalization is derived which is valid for boundary layers with spatial flow. The wall shear stresses were calculated with this equation. Author

N85-13177# Sheffield Univ. (England).
FUNDAMENTAL STUDY OF THREE DIMENSIONAL TWO PHASE FLOW IN COMBUSTION SYSTEMS Final Report, period ending Jun. 1983
J. Swithenbank, B. C. R. Ewan, F. Boysan, W. H. Ayers, and S. V. Malebran 20 Dec. 1983 81 p refs
(Grant AF-AFOSR-0272-82)
(AD-A142886) Avail: NTIS HC A05/MF A01 CSCL 21/2

Details are presented on the latest developments in the mathematical modelling of turbulence with particular reference to the pressure strain transport term. Comparisons are made of the radial variations of normal and shear stress with published data for a round jet and for decay of turbulence for selected flow fields. Work is also reported on the measurement and calculation of flow fields inside a dump combustor using swirl and baffle stabilization. The value of the different turbulence approximations in predicting the flow are discussed. GRA

N85-13178# Iowa State Univ. of Science and Technology, Ames. Heat Transfer Lab.
BIBLIOGRAPHY OF US PATENTS ON AUGMENTATION OF CONVECTIVE HEAT AND MASS TRANSFER, PART 2
R. L. Webb (Pennsylvania State Univ., Univ. Park), A. E. Bergles, and G. H. Junkhan Dec. 1983 194 p
(Contract DE-FG07-81ID-12222)
(DE84-014865; DOE/ID-12222/T1; HTL-32; ISU-ERI-Ames-84257)
Avail: NTIS HC A09/MF A01

Patents are an important source of information on the potential commercialization of augmented heat transfer technology. Present is a bibliography of US patents pertinent to that technology. The total number of patents cited is 454. They are presented in three separate lists: by patent number, alphabetically by first inventor, and by augmentation technique (with secondary arrangement according to mode of heat transfer). DOE

N85-13179# California Univ., Livermore. Lawrence Livermore Lab.
NUMERICAL CALCULATIONS OF STRATIFIED EKMAN LAYER FLOW OVER RIDGES WITH A FINITE ELEMENT MODEL
Robert L. Lee and John M. Leone, Jr. Jun. 1984 6 p refs Presented at the 3rd American Meteorological Society Conf. on Mountain Meteorol., Portland, Oreg., 15 Oct. 1984
(Contract W-7405-eng-48)
(DE84-014482; UCRL-90668; CONF-841059-7) Avail: NTIS HC A02/MF A01

Stratified viscous flows over idealized two dimensional ridges were simulated. Results are presented which first employ periodic lateral boundary conditions and a rigid lid at the top. The top condition is then replaced by an open top boundary condition. Finally, several calculations are presented with certain nonperiodic lateral boundary conditions. DOE

N85-13180# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
EVALUATION OF SELECTED ADVANCED HEAT EXCHANGERS FOR WASTE HEAT RECUPERATION OF HIGH TEMPERATURE STREAMS
C. Bliem, R. Kochan, J. Mittl, R. Piscitella, J. Schafer, A. Synder, D. Wiggins, and J. Zabriskie Feb. 1984 246 p refs
(Contract DE-AC07-76ID-01570)
(DE84-016299; EGG-SE-6534) Avail: NTIS HC A11/MF A01

The design, functional and cost requirements for high-temperature, heat recovery systems (recuperators) and describes the state-of-the-art systems, emerging industrial technologies and new concepts developed by EG and G Idaho, Inc. are discussed. All systems/concepts are then evaluated and compared with respect to corrosion/durability, fouling, performance, operation and maintenance, and economics. DOE

N85-13181# Sandia Labs., Albuquerque, N. Mex. Fluid and Thermal Sciences Dept.
NUMERICAL MODELLING OF THE DRYING OF POROUS MATERIALS
G. Ronald Hadley 1984 9 p refs Presented at the 4th Intern. Drying Symp., Kyoto, 9 Jul. 1984
(Contract DE-AC04-76DP-00789)
(DE84-013056; SAND-83-2332C; CONF-840750-1) Avail: NTIS HC A02/MF A01

A numerical solution technique was presented which solves in one dimension the coupled heat and mass flow equations for water, water vapor, and an inert gas moving through a porous medium. The physical effects included in the resulting computer program PETROS are more complete than for previous simulations, particularly for the gas phase transport. The latter includes effects due to binary gaseous diffusion and Knudsen diffusion as well as Darcy flow. PETROS is thus capable of simulating two-phase flow through porous media. DOE

N85-13182# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho. National Engineering Lab.
DETERMINATION OF OPTIMUM CURIE POINT AS A FUNCTION OF SOURCE AND SINK TEMPERATURES FOR MAGNETIC HEAT PUMPS
D. H. VanHaaften and J. I. Mills 1984 4 p refs Presented at the Intersoc. Energy Conversion Eng. Conf., San Francisco, 19-24 Aug. 1984
(Contract DE-AC07-76ID-01570)
(DE84-016995; EGG-M-24383; CONF-840804-45) Avail: NTIS HC A02/MF A01

Magnetic heat pump cycles are being investigated to determine their feasibility in industrial applications. This analysis noted significant improvements in the performance of these cycles when the magnetic refrigerant's Curie temperature is 5 to 15 K above the average of the sink and load temperatures. When the magnetic cycle's operating temperature are carefully matched with the magnetic core material's Curie temperature, cycle performance can approach Carnot efficiencies. DOE

N85-13183# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho. National Engineering Lab.
MAGNETIC HEAT PUMP CYCLES FOR INDUSTRIAL WASTE HEAT RECOVERY
J. I. Mills, L. D. Kirol, and D. H. vanHaaften 1984 7 p refs Presented at the Intersoc. Energy Conversion Eng. Conf., San Francisco, 19-24 Aug. 1984
(Contract DE-AC07-76ID-01570)
(DE84-017016; EGG-M-24483; CONF-840804-46) Avail: NTIS HC A02/MF A01

Magnetic heat pumps utilize entropy reductions which occur upon magnetization (magnetocaloric effect) in thermodynamic cycles. Magnetic equivalents of Brayton and Ericson (or Stirling) cycles are possible. Magnetic heat pumps with gadolinium working material perform significantly better than conventional equipment. Working materials appropriate for industrial heat pump applications (400 to 500 K) were identified, but performance is not as good as with gadolinium. When better performing high temperature materials are identified, feasible industrial magnetic heat pumps should be possible. DOE

N85-13184# Brown Univ., Providence, R. I. Div. of Engineering.
SIMILARITY CONSIDERATIONS IN 1-COMPONENT 2-PHASE FLOW
P. F. Maeder, R. DiPippo, D. A. Dickinson (American Telephone and Telegraph Co., Princeton, N.J.), and D. E. Nikitopoulos Jul. 1984 41 p refs
(Contract DE-AC03-84SF-12197)
(DE84-016370; DOE/SF-12197/1; TWOPHASE/1) Avail: NTIS HC A03/MF A01

The simplified model fluid presented here for two-phase flow can serve as a basis for the similarity analysis of a variety of substance flows. For the special case of water and R114, it is seen that exact similarity does not exist in the range of interest for geothermal applications, but that conditions can be found for reasonable similarity which permit one to replace water with R114 in laboratory-size apparatus. Thus experimental data and results obtained using R114 in a properly scaled laboratory setup can be converted with reasonable accuracy to those for water. DOE

N85-13185# Oak Ridge National Lab., Tenn. Engineering Physics and Mathematics Div.
DETERMINISTIC SENSITIVITY ANALYSIS OF TWO-PHASE FLOW SYSTEMS: FORWARD AND ADJOINT METHODS Final Report
D. G. Cacuci, E. Wacholder (Technion-Israel Inst. of Technology), S. Kaizerman (Technion-Israel Inst. of Technology), and N. Tomerian (Technion-Israel Inst. of Technology) Jul. 1984 92 p refs Sponsored by EPRI
(Contract DE-AC05-84OR-21400; EPRI Proj. 1441-1)
(DE84-016276; EPRI-NP-3635) Avail: NTIS HC A05/MF A01

A self-contained mathematical formalism for deterministic sensitivity analysis of two phase flow systems, a detailed application to sensitivity analysis of the homogeneous equilibrium model of two phase flow, and a representative application to sensitivity analysis of a model where a transition between single phase and two phase occurs are presented. The rigor and generality of this sensitivity analysis formalism stem from the use of Gateaux (G-) differentials. The major aspects of deterministic sensitivity analysis which include derivation of the forward sensitivity equations, derivation of sensitivity expressions in terms of adjoint functions, explicit construction of the adjoint system satisfied by these adjoint functions, determination of the characteristics of this adjoint system, and demonstration that these characteristics are the same as those of the original quasilinear two phase flow equations are highlighted. It is proven that whenever the original two phase flow problem is solvable, the adjoint system is also solvable and the same numerical methods can be used to solve both the original and adjoint equations. DOE

N85-13186# California Univ., Berkeley. Lawrence Berkeley Lab.
FINITE ELEMENT METHOD FOR A CLASS OF VISCOELASTIC FLOWS IN DEFORMING DOMAINS APPLIED TO JET BREAKUP
R. Keunings May 1984 13 p refs Presented at the 9th Inter. Congr. on Rheology, Acapulco, Mexico, 8-13 Oct. 1984
(Contract DE-AC03-76SF-00098)
(DE84-014571; LBL-17968; CONF-841076-2) Avail: NTIS HC A02/MF A01

A numerical method for solving a class of transient viscoelastic flows in domains with free boundaries which is based on a Galerkin finite element technique combined with a predictor/corrector scheme that allows for the prediction of stress field, velocity field and flow domain as a function of time is presented. The numerical procedure is applied to the analysis of surface tension driven breakup of liquid jets. The nonlinear growth of a periodic disturbance imposed on an infinitely long jet and leading to breakup was studied. It is predicted that in the Newtonian case the birth of satellite drops when inertia forces are present. It is shown that elasticity accelerates the breakup process at short times for an Oldroyd fluid which is consistent with linear stability analyses. This tendency however, is reversed at later times when a pattern of drops connected by stable filaments is obtained. The stabilizing effect of elastic forces, known experimentally for any years, and are predicted shown it is that the breakup mechanism of a viscoelastic jet cannot be described by linearized dynamics. DOE

N85-13187# California Univ., Berkeley. Lawrence Berkeley Lab.
DYNAMICS OF LIQUID FILAMENT BREAKUP
D. W. Bousfield, G. Marrucci, and M. M. Denn May 1984 10 p refs Presented at the 9th Intern. Congr. on Rheology, Acapulco, Mexico, 8-13 Oct. 1984
(Contract DE-AC03-76SF-00098)
(DE84-016008; LBL-17735; CONF-841076-3) Avail: NTIS HC A02/MF A01

The nonlinear growth of surface tension-driven disturbances leading to breakup of a liquid filament is studied, using a one-dimensional approximation of the filament dynamics. The results are consistent with linear stability analyses during the initial portion of the transient, and also enable calculations at long times approaching breakup. Nonlinearities associated with inertial stresses lead to the formation of satellite droplets for Newtonian jets. The retardation of disturbance growth and stabilization of viscoelastic jets at long times is shown to be a consequence of nonlinearities associated with the buildup of large extensional stresses. DOE

N85-13188# Tectonics Research, Inc., Minneapolis, Minn.
DEVELOPMENT OF A BRAUN LINEAR ENGINE-DRIVEN, HEAT-ACTUATED HEAT PUMP Final Report
Jul. 1984 136 p refs Prepared in cooperation with Honeywell, Inc., Roseville, Minn., and with Honeywell, Inc., Bloomington, Minn.
(Contract DE-AC05-84OR-21400)
(DE84-016647; ORNL/Sub-80-61619-1) Avail: NTIS HC A07/MF A01

The operation of a Braun engine/compressor in a heat pump mode was demonstrated. Performance factors with the carbureted breadboard engine version were on the low side and the range of operation below maximum. Component analyses are summarized and the breadboard design, fabrication, and performance tests are described. R.S.F.

N85-13189# Oak Ridge National Lab., Tenn.
INVESTIGATION OF AN EJECTOR HEAT PUMP BY ANALYTICAL METHODS
C. T. Hsu Jul. 1984 63 p refs
(Contract DE-AC05-84OR-21400)
(DE84-016675; ORNL/CON-144) Avail: NTIS HC A04/MF A01

The optimum geometry of a high efficiency ejector including mixing section cross sectional area, mass flow entrainment rate, ejector efficiency, and overall COP for a heat pump cycle was determined. The COP values for different operating conditions were evaluated. The effects of nozzle efficiency and diffuser efficiency on the overall ejector heat pump COP were determined. The off design study estimated the COP for an ejector heat pump operating at off design conditions. An optimum ejector geometry was estimated for each of the refrigerants R-11 and R-113. The COP values for heating obtained are greater than unity, the performance of an ejector heat pump operating in the heating mode should be competitive with that of oil or gas fired furnaces or electrical resistance heaters. DOE

N85-13190# Oak Ridge Gaseous Diffusion Plant, Tenn. Materials and Chemistry Technology Dept.
CALIBRATION AND USE OF FILTER TEST FACILITY ORIFICE PLATES
D. E. Fain and T. W. Selby 31 Jul. 1984 24 p Presented at the 18th DOE Nucl. Airborne Waste Management and Air Cleaning Conf., Baltimore, 13 Aug. 1984
(Contract DE-AC05-84CT-21400)
(DE84-016851; K/PS-5046; CONF-840806-9) Avail: NTIS HC A02/MF A01

There are three official DOE filter test facilities. These test facilities are used by the DOE, and others, to test nuclear grade HEPA filters to provide Quality Assurance that the filters meet the required specifications. The filters are tested for both filter efficiency and pressure drop. In the test equipment, standard orifice plates are used to set the specified flow rates for the tests. There has existed a need to calibrate the orifice plates from the three facilities with a common calibration source to assure that the facilities have comparable tests. A project has been undertaken to calibrate these orifice plates. In addition to reporting the results of the calibrations of the orifice plates, the means for using the calibration results will be discussed. A comparison of the orifice discharge coefficients for the orifice plates used at the seven facilities will be given. The pros and cons for the use of mass flow or volume flow rates for testing will be discussed. It is recommended that volume flow rates be used as a more practical and comparable means of testing filters. The rationale for this recommendation will be discussed. DOE

N85-13191# California Univ., Berkeley. Dept. of Materials and Mineral Engineering.
DIFFUSION OF GASES IN POROUS SOLIDS: SIMULATION AND MEASUREMENTS Technical Progress Report 16 Apr. - 15 Jul. 1984
J. W. Evans 1984 5 p refs
(Contract DE-FG22-82PC-50796)
(DE84-016292; DOE/PC-50796/T6) Avail: NTIS HC A02/MF A01

This quarter experiments have been started to measure the viscosity and diffusivity of methane. Viscosity data are presented. The data are seen to agree well with the predictions of the Chapman-Enskog theory. The experimental argon-nitrogen diffusivity measurements carried out over the past year have deviated somewhat from values predicted by the Chapman-Enskog theory. In an attempt to discover whether this represents an imperfection of the theory or the experiments, an error analysis has been carried out. The large possible errors were found to exist in the experimental data. The major source of error is the sensitivity of the diffusion bridge apparatus to pressure differential across the bridge. That pressure differential must be maintained at the lowest possible value during diffusion experiments in order that transport of gases through the porous plug be by diffusion (rather than viscous flow). Experiments conducted at the limit of sensitivity of the differential pressure gauge and there is therefore little hope for improvement in this direction. The alternative is to use a porous plug with a smaller pore size. DOE

N85-13192# Institut Franco-Allemand de Recherches, St. Louis (France).

PARTICLE ENTRAINMENT IN A COMPRESSIBLE VORTEX [PARTIKELMITFUEHRUNG IN EINEM KOMPRESSIBLEN WIRBEL]
W. Jaeger 5 Oct. 1983 22 p refs In GERMAN
(ISL-CO-230/83) Avail: NTIS HC A02/MF A01

Particle entrainment in a two dimensional compressible vortex formed behind an edge in a shock wave tube was studied. The flow field was visualized by Michelson interferometry. Flow velocity was measured by laser Doppler velocimeters and doppler imaging. Experimental results are compared with numerical simulations of the flow field in a vortex. Particle motion was calculated to a first approximation using Stokes law. Author (ESA)

N85-13193# Institut Franco-Allemand de Recherches, St. Louis (France).
STUDY OF THE VELOCITY-ACOUSTIC PRESSURE CORRELATION IN A COLD JET, CENTERED ON THE SIGN AND THE AMPLITUDE OF THE VELOCITY FLUCTUATIONS [ETUDES DES CORRELATIONS VITESSE-PRESSION ACOUSTIQUE CONDITIONNEES SUR LE SIGNE ET L'AMPLITUDE DE LA FLUCTUATION DE VITESSE DANS UN JET FROID]
M. Schaffar and D. Laxer 16 Aug. 1983 43 p refs In FRENCH
(ISL-R-124/83) Avail: NTIS HC A03/MF A01

The sources of noise in cold jets were investigated using a laser velocimeter coupled with a microphone. The two dimensional exploration of the jet explains most of the noise once the correlations are integrated. Most of the noise is shear noise. The correlations are significant only for 20 and 30 deg angles. The negative part of the velocity fluctuations corresponds to most of the emitted noise. Author (ESA)

N85-13194# European Space Agency, Paris (France).
MODEL EQUATIONS DESCRIBING UNSTEADY FLUID MOTION
Ulrich Nehring May 1984 32 p refs Transl. into ENGLISH of "Model-Gleichungen zur Beschreibung instationaerer Stroemungsvorgaenge" DFVLR-MITT-83-17, Goettingen, West Germany, May 1983 Report previously announced as N84-19775
(ESA-TT-850; DFVLR-Mitt-83-17) Avail: NTIS HC A03/MF A01; original version available from DFVLR, Cologne DM 17.50

A system of nonlinear differential equations with four variables, based on a bulk viscosity concept, is presented and tested numerically. The solution by an explicit finite difference method permits the simulation of fairly general flow fields. Three dimensional flow over a backward facing step, vortex separation after a rectangular block, and the longitudinal vortex after an inclined half-plate are calculated. For step flow, qualitative agreement is obtained with experimental results on wall pressure and flow reattachment length. The physical interpretation of the equations emphasizes the effects of pressure distribution on the formation of large scale structures and on unsteady fluid motion.
Author (ESA)

N85-13195# Imperial Coll. of Science and Technology, London (England). Computational Fluid Dynamics Unit.
NUMERICAL CALCULATION OF STEADY TURBULENT FLOWS IN ADVERSE PRESSURE GRADIENTS
J. O. Ilegbusi Dec. 1983 28 p refs
(CFD/83/9) Avail: NTIS HC A03/MF A01

Numerical calculations of turbulent flows in adverse streamwise pressure gradients (a boundary layer developing in a decreasingly-adverse pressure gradient; another in an increasingly-adverse one; and flow in a conical diffuser) are presented. The calculations employ a finite-domain scheme and a variant of the semi-implicit method for pressure linked equations. The effect of pressure gradient on the log-law wall-function is accounted for. An expanding-grid system is used to fit the flow configurations considered. The turbulent stresses in the transport equations are modelled using an isotropic eddy viscosity which is deduced from the specific turbulent kinetic-energy and the time-mean square of the vorticity fluctuations. The predictions compare favorably with experimental results. Author (ESA)

N85-13196# Imperial Coll. of Science and Technology, London (England). Computational Fluid Dynamics Unit.
PROGRESS IN THE DEVELOPMENT OF A TWO-FLUID MODEL OF TURBULENCE FOR NEAR-WALL FLOWS, PART 1
J. O. Ilegbusi Apr. 1984 30 p refs Sponsored by UK Science and Engineering Research Council
(CFD/84/7-Pt-1) Avail: NTIS HC A03/MF A01

A two-fluid turbulence model in which the fluids are defined as fast and slow and the entrainment rate is formulated to be proportional to the volume fraction of the fast fluid is described. The model constants which describe the interfluid mass transfer, friction and diffusion are optimized with reference to a boundary layer. The results based on the set of constants chosen are compared with experimental data. The results show that despite the difference in the definition of the two fluids in the experimental study and the present one, the mean velocities compare favorably. Author (ESA)

N85-13197# Imperial Coll. of Science and Technology, London (England). Computational Fluid Dynamics Unit.
PROGRESS IN THE DEVELOPMENT OF A TWO-FLUID MODEL OF TURBULENCE FOR NEAR-WALL FLOWS. PART 3: PRELIMINARY INVESTIGATION OF A STABLY-STRATIFIED BOUNDARY LAYER
J. O. Ilegbusi Jun. 1984 21 p refs Sponsored by UK Science and Engineering Research Council
(CFD/84/9-Pt-3) Avail: NTIS HC A02/MF A01

A compressible form of the two-fluid turbulence model is postulated. It includes buoyancy effects in the momentum equation and in the determination of the fragment size. The model is applied to a wall boundary-layer flow at low Mach number, with the difference between the stream and wall temperatures large enough for fluid properties to vary. Results show a substantial reduction in intermittency factors across the boundary layer compared with results for the case with no buoyancy. The intermittency factor and effective viscosity (and hence the turbulence level and heat flux) appear to decay with downstream distance. Author (ESA)

N85-13198# Imperial Coll. of Science and Technology, London (England). Computational Fluid Dynamics Unit.
PROPOSAL FOR WALL FUNCTION FOR FRICTION AND HEAT TRANSFER IN THE PRESENCE OF ROUGHNESS AND MASS TRANSFER
J. O. Ilegbusi Jul. 1984 18 p refs Sponsored by UK Science and Engineering Research Council
(CFD/84/12) Avail: NTIS HC A02/MF A01

The heat transfer characteristics of a turbulent boundary layer over a rough, porous wall through which mass is injected are predicted. A wall function that accounts for the simultaneous influences of roughness and mass transfer is proposed. Although it has no strong theoretical foundation, the proposal agrees with experiment. Cases with and without unheated lengths of plate are considered. The separate effect of roughness without mass transfer is investigated. The predictions compare well with the measurements for uniform-grain elements under fully rough conditions.
Author (ESA)

N85-13199# Imperial Coll. of Science and Technology, London (England). Computational Fluid Dynamics Unit.
AN ORGAN-PIPE OSCILLATION
Wu Jzy Feb. 1984 29 p ref Sponsored by UK Health and Safety Executive
(PDR/CFDU-IC/14) Avail: NTIS HC A03/MF A01

The ability of the PHOENICS program to calculate an organ pipe oscillation was tested. Predictions for velocity amplitude = 10 m/sec, frequency = 100/sec, and duct length = 1.0 m are presented. Quantitative PHOENICS results agree with those of an analytical solution. Author (ESA)

N85-13200# Imperial Coll. of Science and Technology, London (England). Computational Fluid Dynamics Unit.
LAMINAR JET ISSUING INTO STAGNANT SURROUNDINGS
S. B. Jia Mar. 1984 37 p refs

(PDR/CFDU-IC/15) Avail: NTIS HC A03/MF A01

Calculations performed with the PHOENICS code for a laminar round jet issuing into a stagnant surrounding are described. Systematic grid-dependence studies were made and grid-independent solutions were obtained. Grid-independent results agree with the exact solution. The expected similarity behavior is also predicted. Author (ESA)

N85-13201# Centre Technique des Industries Mecaniques, Senlis (France).

TAP NOISE-PRESSURE FLUCTUATIONS. STUDY OF THE ACOUSTIC BEHAVIOR OF HYDRAULIC EQUIPMENT IN BUILDINGS AS A FUNCTION OF THE TEMPERATURE Final Report [BRUIT ROBINET/FLUCTUATIONS DE PRESSION. ETUDE DU COMPORTEMENT ACOUSTIQUE DES EQUIPMENTS HYDRAULIQUES DU BATIMENT EN FONCTION DE LA TEMPERATURE]

G. Bernard, M. Letiche, and C. Kegozzi Mar. 1983 163 p refs In FRENCH

(CETIM-11-H-337) Avail: NTIS HC A08/MF A01

Tap noise was studied using a hydrophone. A test bench provided with a noise spectra analyzer was employed. Studies with hot water showed the evolution of the noise level with the water temperature. The normalized noise measurement method is described, and is proposed as a standard for France. The curves showing the effects of temperature for different kind of valves are presented. Author (ESA)

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources*. For related information see also *06 Aircraft Instrumentation*, and *19 Spacecraft Instrumentation*.

N85-13202 National Physical Lab., Teddington (England). Div. of Materials Applications.

DETECTION OF CRACKS IN A PLASTICS PIPE JOINT BY REFLECTION HOLOGRAPHY

G. D. Dean, A. E. Ennos, and G. B. Quinn Sep. 1984 33 p refs

(NPL-DMA(A)-87/MOM-70; ISSN-0143-7313) Copyright. Avail: Issuing Activity

A simple reflection holographic technique to measure the distortion around a thermoplastics pipe joint caused by the application of a small internal pressure is described. The presence and development in the socket of an internal crack, introduced by elevated temperature fatique loading, can be detected through the change in distortion which results. The simplicity of the technique allows its application to pipe joint inspection outside a laboratory, and the remaining life of a cracked joint can be predicted. Author (ESA)

N85-13203 National Physical Lab., Teddington (England). Div. of Materials Applications.

A SIMPLE, LOW COST POTENTIOSTAT FOR CORROSION STUDIES

P. E. Francis and A. S. Dolphin Jul. 1984 11 p refs

(NPL-DMA(A)-47; ISSN-0143-7313) Copyright. Avail: Issuing Activity

A potensiostat for long term tests in sea water was designed, using readily available integrated-circuit operational amplifiers and voltage stabilizers. Reference electrode to specimen voltage is + or - 2V. Specimen to counter electrode voltage is + or - 10V. Maximum output current is 0.1 A. Inputs are isolated from earth. Reference electrodes input impedance is $>$ 100 million ohms. It has recording outputs for cell-current and specimen-to-reference potential. In performance tests, potential drift never exceeds 5 mV over a 50 day period. Author (ESA)

N85-13204# California Univ., Livermore. Lawrence Livermore Lab.

DEVELOPMENTS OF OPTICAL FAST-GATED IMAGING SYSTEMS

H. A. Koehler and D. Kotecki Aug. 1984 10 p refs Presented at the 16th Intern. Congr. on High Speed Phot. and Photonics, Strasbourg, 27-31 Aug. 1984

(DE84-016170; UCRL-90494; CONF-840887-2) Avail: NTIS HC A02/MF A01

Several fast-gated imaging systems to measure ultra-fast single-transient data have been developd for time-resolved imaging of pulsed radiation sources. These systems were designed to achieve image recording times of 1 to 3 ms and dynamic ranges of $>$ 200:1 to produce large two-dimensional images (greater than or equal to 10 (to the 4th power) spatial points) of 1 to 2 ns exposure and small two-dimensional images (less than or equal to 200 spatial points) of less than or equal to 0.5 ns exposure. Both MCP intensified solid-state two-dimensional framing cameras and streak camera/solid-state camera systems were used; the framing camera system provides snap shots with high spatial resolution whereas the streak camera system provides for limited spatial points each with high temporal resolution. Applications of these systems include electron-beam, X-ray, gamma-ray, and neutron diagnostics. This report reviews the characteristics of the major components of fast-gated imaging systems developed at Lawrence Livermore National Laboratory. System performances are described in view of major experiments, and the diagnostic requirements of new experiments in atomic physics (X-ray lasers) and nuclear physics (fusion) are indicated. DOE

N85-13205*# California Univ., Berkeley. Space Sciences Lab.

STUDY OF INSTRUMENT DESIGN OPTIONS FOR THE COLUMBUS SPECTROSCOPY MISSION Semiannual Report

Michael Hettrick and Stuart Bowyer 1984 134 p refs

(Grant NAG5-420)

(NASA-CR-174072; NAS 1.26:174072) Avail: NTIS HC A07/MF A01 CSCL 14B

Design work carried out as part of the pre-phase A studies in support of an orbiting COLUMBUS spectroscopy observatory is summarized. Also included are new findings resulting from a reanalysis initiated in response to the following guidelines: (1) The strawman satellite design, which assumed a telescope 6 meters in length followed by a 3-meter spectrograph, resulted in an observatory which was prohibitively costly; (2) Systems which optimize effective area and provide 40 arc second fields are examined; (3) Systems not containing entrance apertures were found undesirable; and (4) The normal incidence Rowland circle design is analyzed. The following instrument design options were analyzed: (1) The 1/2 Meter Telescope Rowland Circle Spectrometer; (2) A 1 Meter Telescope with a Rowland Circle Spectrometer; (3) A New Design Grazing Incidence Telescope with a Berkeley Grazing Incidence Echelle Spectrometer; and (4) A New Design Grazing Incidence Spectroscopic Telescope with Rowland Circle Spectrometer. E.R.

N85-13206# Rockwell International Corp., Golden, Colo. Energy Systems Group.

EVALUATION OF THERMOCOUPLE JUNCTION TEMPERATURE

Robert L. Thompson, Robert S. Stant, Deborah K. Szeluga, and G. A. Riordan, ed. 10 Jun. 1984 7 p refs

(Contract DE-AC04-76DP-03533)

(DE84-015159; RFP-3623) Avail: NTIS HC A02/MF A01

The ice point (0(0)C) is the most important temperature in thermocouple measurements. For interlaboratory reproducibility most thermocouple calibration curves are referenced to the ice point. Therefore, before one can accurately interpret a thermocouple's voltage output, the accuracy of the reference junction (0(0)C) must be known. The purpose is to evaluate and report on the variety of ways the Rocky Flats Physical Metrology Laboratory (PML) creates or simulates a 0(0)C environment. The following methods are evaluated in this report: ice bath of distilled water + distilled ice; ice bath of tap water + tap ice; and thermistors. In addition, the effects of using various Type SX extension leads between the thermocouple and the reference junction are evaluated. This was undertaken because all PML automated Thermocouple Calibration Systems show an offset at 0(0)C of between 0.2 and 0.6(0)C for Type S thermocouples. Justification for subtracting out this bias is the specific goal of this investigation. DOE

N85-13207# GA Technologies, Inc., San Diego, Calif.
FIELD INSTALLED BRAZED THERMOCOUPLE FEEDTHROUGHS FOR HIGH VACUUM EXPERIMENTS
Paul M. Anderson and Charles Messick Dec. 1983 6 p refs Presented at the 10th Symp. on Fusion Eng., Philadelphia, 5-9 Dec. 1983 Submitted for publication
(Contract DE-AT03-76ET-51011; GA Proj. 3344)
(DE84-013556; GA-A-17225; CONF-831203-165) Avail: NTIS HC A02/MF A01

In order to reduce the occurrence of vacuum leaks and to increase the availability of the DIII vacuum vessel for experimental operation, effort was applied to developing a vacuum-tight brazed feedthrough system for sheathed thermocouples, stainless steel sheathed conductor cables and tubes for cooling fluids. This brazed technique is a replacement for elastomer O ring sealed feedthroughs that have proven vulnerable to leaks caused by thermal cycling, etc. To date, about 200 feedthroughs were used. Up to 91 were grouped on a single conflat flange mounted in a bulkhead connector configuration which facilitates installation and removal. Investigation was required to select a suitable braze alloy, flux and installation procedure. Braze alloy selection was challenging since the alloy was required to have: (1) melting temperature in excess of the 250 C (482 F) bakeout temperature; (2) no high vapor pressure elements; (3) good wetting properties when used in air with acceptable flux; and (4) good wettability to 300 series stainless steel and Inconel. DOE

N85-13208# California Univ., Livermore. Lawrence Livermore Lab.
A MEANS OF EXTENDING STREAK CAMERA RECORDING INTO THE IMPORTANT 1300-1600 nm WAVELENGTH REGIME: PARAMETRIC FREQUENCY UPCONVERSION
M. E. Lowry, M. D. Rotter, and D. R. Jander Jul. 1984 8 p refs Presented at the SPIE Ann. Tech. Symp., San Diego, Calif., 19-24 Aug. 1984
(Contract W-7405-eng-48)
(DE84-015666; UCRL-90496; CONF-840872-16) Avail: NTIS HC A02/MF A01

Preliminary data are presented demonstrating the feasibility of coupling an optical parametric frequency upconverter to a streak camera, thereby realizing a hybrid recording system that can sensitively record very fast (approx. 10 psec) single shot infrared events. The data presented represent experimental work in the upconversion of 845 nm light. This wavelength was chosen for experimental convenience to expedite the proof of principle demonstration. Results give an estimated upconversion quantum efficiency of about 25%. Details of future experiments in upconversion/streak camera recording at 1300 nm are discussed. DOE

N85-13209# Sandia Labs., Albuquerque, N. Mex. Digital Systems Development Div.
ANALOG DISC RECORDER SYSTEM: OPERATOR'S REFERENCE MANUAL
Jerome D. OBrien and Ervin I. Smith Jul. 1984 99 p
(Contract DE-AC04-76DP-00789)
(DE84-016926; SAND-83-0251) Avail: NTIS HC A05/MF A01

The FM Analog Disc Recorder System is a cost efficient means of capturing analog transient data from many channels; it has high frequency response and long record time. It can digitize recorded signals, correct internal distortion, and present the data as plots either on a CRT, hardcopy plot, or both. The system is easy to use, self-contained, and compact. DOE

N85-13210# Argonne National Lab., Ill.
SIMULATION OF OPTICAL CONFIGURATIONS AND SIGNAL PROCESSING METHODS IN ANGER-TYPE NEUTRON-POSITION SCINTILLATION DETECTOR
C. T. Roche, M. G. Strauss, and R. Brenner 1984 10 p refs Presented at Nucl. Sci. Symp., Orlando, Fla., 31 Oct. 1984
(Contract W-31-109-eng-38)
(DE84-012095; CONF-841007-2) Avail: NTIS HC A02/MF A01

The spatial linearity and resolution of Anger type neutron position scintillation detectors were studied as a semi-empirical model. Detector optics with either an air gap or optical grease between the scintillator and the dispersive light guide are considered. Three signal processing methods which truncate signals from PMT's distant from the scintillation are compared with the linear resistive weighting method. Air gap optics yields a 15% improvement in spatial resolution and 50% reduction in differential and integral nonlinearity relative to grease coupled optics, using linear processing. Using signal truncation instead of linear processing improves the resolution 15% to 20% for the air gap and 20% to 30% for the grease coupling case. The initial discrepancy in the resolution between the two optics nearly vanished, however, the linearity of the grease coupled system is still significantly poorer. DOE

N85-13211# Los Alamos Scientific Lab., N. Mex. Hydrodynamics Group.
FLASH RADIOGRAPHY AS A QUANTITATIVE TOOL
Timothy R. Neal Aug. 1984 8 p refs Presented at the 16th Intern. Congr. on High Speed Photography and Photonics, Strasbourg, 27-31 Aug. 1984
(Contract W-7405-eng-36)
(DE84-016465; LA-UR-84-2676; CONF-840887-8) Avail: NTIS HC A02/MF A01

Flash radiographs have long been useful for interpreting dynamic events. Such interpretation ranges from merely looking at a radiograph to aid in understanding the event to fully deconvolving film densities to reconstruct actual masses and positions. Between these two extremes are the possibilities of using trained observers to select features of interest or of using densitometers to aid in such descriptions. Several examples of these latter methods are illustrated to indicate that reasonable precision can be obtained in this way and that flash radiography can indeed be a quantitative science. The examples are from the field of shock wave hydrodynamics. The radiographs were taken at the PHERMEX facility, a 25 MeV machine emitting about 30 R at a meter in a pulse of 100 ns for these examples. The first situation involves the selection of the position of a thin, low density beryllium foil embedded in a moving high density material, uranium. The second involves the selection of the location or of the alignment direction of step mass discontinuities such as those found in shock waves or in interfaces between materials of different density. DOE

N85-13212# Pennsylvania Univ., Philadelphia.
POSITRON RING SYSTEM USING ANGER-TYPE DETECTORS Progress Report
Gerd Muehllehner Aug. 1984 30 p
(Contract DE-AC02-80EV-10402)
(DE84-016788; DOE/EV-10402/T3) Avail: NTIS HC A03/MF A01

A single ring positron camera consisting of six position sensitive single crystal detectors was constructed, and its performance was evaluated for a variety of applications. The major factors limiting its performance were established, and methods to overcome some of these limitations were explored. At low data rates, a spatial resolution of 6.5 mm full width half maximum (FWHM) was measured in the final reconstructed image, and at high data rates a spatial resolution below 8 mm FWHM was achieved. Initial problems in imaging extended objects are overcome through careful normalization of the data and by using an iterative reconstruction algorithm which is insensitive to the missing data due to the gaps between the detectors. DOE

N85-13213# California Univ., Berkeley. Lawrence Berkeley Lab. Engineering and Technical Services Div.
PHYSICS AND DESIGN OF ADVANCED INFRARED BOLOMETERS AND PHOTOCONDUCTORS

E. E. Haller Jul. 1984 23 p refs Presented at the 3rd Intern. Conf. on Infrared Phys., Zurich, 23-27 Jul. 1984 Submitted for publication
(Contract DE-AC03-76SF-00098)
(DE84-016883; LBL-17483; CONF-840725-6) Avail: NTIS HC A02/MF A01

Spaceborne infrared telescopes and other very low photon flux experiments require photoconductors and bolometers with ever increasing sensitivity working at the background limit. Improvements in the understanding of the physics of these devices, advances in semiconductor materials synthesis and device technology, and the introduction of new device concepts such as uniaxially stressed photoconductors can, in combination, fulfill these new demands. DOE

N85-13214# Argonne National Lab., Ill.
PORTABLE MICROPROCESSOR-CONTROLLED INSTRUMENT FOR SENSING, IDENTIFYING AND MONITORING GASEOUS CHEMICALS
J. R. Stetter, S. Zarcomb and W. R. Penrose 1984 2 p refs Presented at Fall Meeting of the Electrochem. Soc., New Orleans, 7 Oct. 1984
(Contract W-31-109-eng-38)
(DE84-013431; CONF-841058-3) Avail: NTIS HC A02/MF A01

To protect US Coast Guard personnel from exposure to hazardous chemicals, a portable detector that responds promptly to many different compounds, identifies the detected compounds, and monitors their concentrations was developed. The amperometric gas sensing offered the best prospects. One task was to extend the applicability of amperometric toxic gas sensors to electrochemically inactive species. This was achieve by exposing the electrochemically inactive constituents to heated, noble metalcatalysts before introducing them to the amperometric sensor. This breakthrough laid the groundwork for development of a prototype instrument based on an array of four amperometric toxic gas sensors and two heated noble metal filaments. The four sensors can be rapidly switched to one of several operating modes. Four modes and four sensors yield 16 measured parameters.DOE

N85-13215# Valvo Roehren- und Halbleiterwerke der Philips G.m.b.H., Hamburg (West Germany). Produktbereich Diskrete Halbleiter.
DEVELOPMENT OF COMPONENTS FOR MICRO-C ORIENTED SENSOR SYSTEMS Final Report, Mar. 1983
Guenter Andrae, Walter Demmer, Peter Draheim, Heinz Sauermann, and Wilfried Germer Bonn Bundesministerium fuer Forschung und Technologie Jul. 1984 192 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-84-126; ISSN-0340-7608) Avail: NTIS HC A09/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 36

A low cost technology for the detection of pressure and force and a digital electronic device for signal conditioning were developed. A thin silicon film plane pressure sensor for pressures between 1 and 10 bar in liquids and gases which do not attack the CuBe of the metal spring or the plastic envelope was built. A microcomputer compatible sensor system was developed. The sensor signal is time-analogously transformed to a double valued signal which can be recorded by a microcomputer. Author (ESA)

N85-13216# Krohne Messtechnik G.m.b.H. und Co. K.G., Duisburg (West Germany). Entwicklungslab.
MAGNETIC INDUCTIVE FLOWMETER FOR LOW CONDUCTING LIQUIDS Final Report, Dec. 1981
Friedrich Hofman, Ruediger Kuerten, and Ronald vanderPol Bonn Bundesministerium fuer Forschung und Technologie Jun. 1984 68 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-84-136; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 14.50

A flow head for magnetic inductive flowmeters for low conducting liquids was constructed. A higher frequency than usual in industrial MJ magnetic inductive flowmeters was chosen to get a higher signal to noise ratio. The failure curve of the system is highly influenced by the shift of the zero point. The achieved zero stability allows no commercial applications. Author (ESA)

N85-13217# Rohde and Schwartz, Munich (West Germany). Hauptabteilung Analog- und HF-Messgeraete.
DEVELOPMENT OF A FEASIBILITY MODEL FOR A THIN-FILM PRECISION POWER METER Final Report, Dec. 1983
Hans Delfs, Franz Dosch, and Andreas Loeser Bonn Bundesministerium fuer Forschung und Technologie Aug. 1984 32 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-84-161; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 7

The development of a thermally coupled transducer and its evaluation circuit for a precision power meter is described. A thin film transducer made up of two temperature sensors and operating in a bridge configuration has the advantages of dc coupling for the RF circuit, very fast transient response and very good RF matching up to the GHz region. Author (ESA)

N85-13218# Technical Research Centre of Finland, Espoo. Metals Lab.
INSTRUMENTED IMPACT TESTING MACHINE WITH REDUCED SPECIMEN OSCILLATION EFFECTS
Rauno Rintamaa, Klaus Ranka, Kim Wallin, Kari Ikonen, Heli Talja, Heikki Kotilainen, and Erkki Sirkkola Jul. 1984 46 p refs Sponsored by Finnish Ministry of Trade and Industry
(VTT-290; ISBN-951-38-2098-X; ISSN-0358-5077) Avail: NTIS HC A03/MF A01

A pendulum-type instrumented Charpy test apparatus based on inverted test geometry was developed. Geometry inversion reduces inertia load and specimen oscillation effects. Initial impact energy is double that of standard (300 J) impact testers, allowing the use of larger (10 x 20 x 110 mm) bend specimens than normal Charpy specimens. The rotation axis in the three point bending is nearly stationary, making COD-measurements possible. Inertia effects and specimen oscillations are compared with the conventional tester, and using an analytical finite element model for Charpy V-notch specimens. Better performance for the inverted geometry is reported. Author (ESA)

N85-13219# Fraunhofer-Inst. fuer Festkoerpertechnologie, Munich (West Germany).
ION BEAM LITHOGRAPHY Final Report, Mar. 1983
Karl Haberger, Heiner Ryssel, and Helmut Kranz Bonn Bundesministerium fuer Forschung und Technology Sep. 1984 95 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-84-182; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 20

The physical possibilities of ion beam lithography were investigated with regard to its technical applicability. Resists were evaluated concerning their suitability for ion-beam exposure, the compatibility of ion beam exposure with standard semiconductor processing for direct wafer exposure, and the focusing of intense ion beams into small spots. Based on an available focusing system, a fine-focus unit with a gallium field-emission source was constructed. With this unit gallium ions of up to 50 keV can be focused into a spot of 0.7 micron diameter. Author (ESA)

N85-13220# National Academy of Sciences - National Research Council, Washington, D. C. Ad Hoc Committee on Earthquake Engineering Facilities and Instrumentation.
EARTHQUAKE ENGINEERING FACILITIES AND INSTRUMENTATION
1984 45 p refs Sponsored in part by Office of Science and Technology Policy
(Contract EWW-84-C-1555)

(PB84-231661; CETS/EEFL-1) Avail: NTIS HC A03/MF A01 CSCL 14B

The need for large scale experimental earthquake engineering facilities and instrumentation is reviewed. The feasibility of meeting the perceived need are determined and the priorities for a U.S. program to fill the need are assessed. Conclusions and recommendations are provided regarding: (1) a research/educational base, (2) full or nearly full scale data, (3) experimental facilities, (4) computer modeling, (5) use of Japanese facilities, and (6) operational funding and program management. GRA

N85-13116# Joint Publications Research Service, Arlington, Va.
SEMICONDUCTOR-TYPE TRANSDUCER WITH UNIVERSAL STRAIN GAUGE FOR MEASUREMENT OF LOW PRESSURES Abstract Only
Yu. I. Zaganyach, I. I. Maryamova, T. M. Ivashchuk, A. P. Kutrakov, and O. A. Polishchuk *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 81 Transl. into ENGLISH from Pribory i Sistemy Upr. (Moscow), no. 3, Mar. 1984 p 31-32 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13548# Joint Publications Research Service, Arlington, Va.
PRESENT STATUS, FUTURE PROSPECTS OF DOMESTIC ACOUSTICAL INSTRUMENTS
Li Guibin *In its* China Rept.: Sci. and Technol. (JPRS-CST-84-001) 16 Jan. 1984 p 24-30 Transl. into ENGLISH from Yingyong Shengxue (Beijing), v. 2, no. 3, Jul. 1983 p 1-4 (For primary document see N85-13545 04-70)
Avail: NTIS HC A03/MF A01

36 LASERS AND MASERS

Includes parametric amplifiers.

N85-13221*# Maryland Univ., College Park. Dept. of Electrical Engineering.
INVESTIGATION OF RF EXCITED CW CO2 WAVEGUIDE LASERS Progress Report
U. Hochuli Nov. 1984 26 p
(Grant NAG5-263)
(NASA-CR-174106; NAS 1.26:174106) Avail: NTIS HC A03/MF A01 CSCL 20E

The RF excited 2 to 3W CW CO2 waveguide lasers with lifetimes of the order of 10(4) to 2.10(4) hours were produced. This was achieved with CO and N2 bearing gas mixtures and with internal as well as external discharge electrodes. It is noted that these tests were conducted with unstabilized lasers which drift around in their signatures. The average power output was reduced to about one half of the highest peak power output in the signature. One of the lasers, no. 1.1, still shows 60% of its original output power after it was cycled on and off every 10 minutes for more than 50,000 times. The starting voltage and driving point impedance of the RF excited gas discharge structure for different gas pressures and mixtures were measured. These data will serve as a basis for the matching and starting network optimization. The second laser body was frit and indium sealed. To our a vacuum leak between the bore and electrode holes was noted. The leak seems to be due to a defect or crack in the BeO body. E.A.K.

N85-13222# Royal Signals and Radar Establishment, Malvern (England).
SCATTERING FROM MULTI-SCALE SURFACE
D. L. Jordan, R. C. Hollins, and E. Jakeman Feb. 1984 25 p refs
(RSRE-Memo-3656; BR92719) Avail: NTIS HC A02/MF A01

Carbon dioxide laser Gaussian scattering from rough surfaces is reviewed. The effects can be generated using small illuminated regions or by viewing the scattered radiation in the Fresnel region. Single-scale surfaces, multiple-scale surfaces (i.e., fractal), and subfractal surfaces can be distinguished. Solid surfaces exhibit fractal behavior over a significant range of scale sizes; the existence of scale sizes smaller than the probing radiation wavelength produces significant large angle scattering. Liquid surfaces exhibit subfractal behavior. The use of scattering measurements for remote sensing of surface finish and in explaining deviations from noise-like statistics in microwave radar returns is suggested. Author (ESA)

N85-13223# California Univ., Livermore. Lawrence Livermore Lab.
BEAM PROFILING IN GIGAWATT 1064-NM LASERS USED IN RESEARCH ON OPTICAL MATERIALS AT LIVERMORE
D. Milam and S. E. Peluso 7 Sep. 1984 9 p refs Presented at the 28th SPIE Ann. Tech. Symp. on Optics and Electro-Optics, San Diego, Calif., 19 Aug. 1984
(Contract W-7405-eng-48)
(DE84-087226; UCRL-90540; CONF-84087226) Avail: NTIS HC A02/MF A01

Laser pulses with intensities ranging from 10 to the 9th power to 10 to the 11th power watts/sq cm are routinely used at Livermore to measure nonlinear properties of optical materials. The energy in each of these pulses was measured with an absorbing glass calorimeter. Both vidicon cameras and photographic emulsions were used to record the fluence distribution in laser beams. Pulse waveforms are recorded by a streak camera, or by a combination of a photodiode and an oscilloscope. Procedures for using this data to determine the fluence and intensity for short duration laser pulses are described. DOE

N85-13224# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
COMPUTATION OF THE NONEQUILIBRIUM FLOW IN A GASDYNAMIC LASER
Hai-hsing Yen and Li-yin Chen 25 Apr. 1984 29 p refs Transl. into ENGLISH from Lixue Xuebao (China), v. 10, no. 4, 1978 p 274-287
(AD-A141022; FTD-ID(RS)T-0311-84) Avail: NTIS HC A03/MF A01 CSCL 20/5

A three-modes-four temperatures vibrational relaxation model for a CO2-N2-H2O laser system is presented, and a set of fairly rigorous relaxation equations given. A series of problems related to computations of pseudo-one-dimensional nonequilibrium flows was analyzed and massive numerical computations using data obtained, were carried out for the rate of relaxation. B.G.

N85-13225# Brookhaven National Lab., Upton, N. Y. Physics Dept.
A NORMAL-INCIDENCE MONOCHROMATOR BRANCH LINE ON THE FEL-UNDULATOR FOR EXPERIMENTAL STUDIES IN THE 5 TO 30 eV REGION
P. D. Johnson, N. G. Stoffel, R. Klaffky, and N. V. Smith (Bell Telephone Labs., Murray Hill, N.J.) 1983 14 p refs Presented at the 3rd Natl. Conf. on Synchrotron Radiation Instrumentation, Upton, N.Y., 12 Sep. 1983
(Contract DE-AC02-76CH-00016)
(DE84-014379; BNL-34300; CONF-830910-14) Avail: NTIS HC A02/MF A01

The proposed installation of an experimental beam line to exploit the photon flux from the free electron laser undulator on the Brookhaven VUV storage ring is described. It is shown that under the normal operating conditions of the VUV ring the undulator should produce an intense flux of photons in a highly collimated beam in the energy range from 5 to 200 eV. It is intended to construct a beam line based on a McPherson 225 monochromator which allows an experimental program in the range 5 to 30 eV. The optical layout of the beamline is discussed with particular emphasis on the requirements of coupling a highly collimated source to such a monochromator. The experimental program is designed to utilize either the high photon flux with medium resolution or a more modest flux with the potential high resolution to be obtained from the monochromator. Planned experiments include high k-space resolution angle-resolved photoemission, high resolution gas phase studies, and spin resolved photoemission from solid surfaces. DOE

N85-13226# California Univ., Livermore. Lawrence Livermore Lab.

AN 850 J, 150 NS NARROW-BAND KRYPTON FLUORIDE LASER

J. Goldhar, K. S. Jancaitis, J. R. Murray, and L. G. Schlitt (Pulse Sciences, Inc., San Leandro, Calif.) 16 Dec. 1983 7 p refs Presented at the 13th Intern. Conf. on Quantum Electron. (CLEO), Anaheim, Calif., 18 Jun. 1984
(Contract W-7405-eng-48)
(DE84-013077; UCRL-90137; CONF-840629-5) Avail: NTIS HC A02/MF A01

Laser experiments on a 248 nm KrF laser with a 30x40x120 cm grain volume and an injection locked unstable resonator cavity are discussed. The volume is pumped by six 450 kV, 90 kA electron beam generators using water pulse forming lines. DOE

N85-13227# Stanford Univ., Calif. Dept. of Electrical Engineering.

LASER-DRIVEN PARTICLE ACCELERATORS Final Technical Report

R. H. Pantell and M. A. Piestrup Jul. 1984 42 p refs
(Contract DE-AT03-76ER-71042)
(DE84-015953; DOE/ER-71042/T1) Avail: NTIS HC A03/MF A01

Theoretical and experimental studies were performed on laser-driven particle accelerators. The theoretical work primarily consisted of detailed analysis and computer simulation of the stimulated Cherenkov interaction. Additional analysis was also done on the two-wave accelerator, the limited interaction accelerator, and the inverse synchrotron accelerator. These were compared with other techniques such as the beat-wave, inverse Smith-Purcell, and the inverse free-electron laser. Experimental work was primarily devoted to showing the feasibility of the stimulated Cherenkov interaction for the acceleration of charged particles using a laser. This work can be broken own into three experiments: a measurement of the change in momentum spectrum of an electron beam passing through a laser field, the dependence of this change on the refractive index of the medium in which the interaction occurs, and the observation of second harmonic radiation from the resulting bunched electron beam. In each case the results predicted from analysis and Monte Carlo simulations are in good agreement with the data. DOE

N85-13228# Los Alamos Scientific Lab., N. Mex. Industrial Hygiene Group.

INTERMEDIATE RESULTS OF A 1-YEAR STUDY OF A LASER SPECTROMETER IN THE DOE FILTER TEST FACILITIES

Sidney C. Soderholm and Marvin I. Tillery 1984 16 p refs Presented at the 18th DOE Nucl. Airborne Waste Management and Air Cleaning Conf., Baltimore, 12-16 Aug. 1984
(Contract W-7405-eng-36)
(DE84-016478; LA-UR-84-2531; CONF-840806-10) Avail: NTIS HC A02/MF A01

The model LAS-X laser spectrometer was studied. The principal objectives were to gain operational experience with the LAS-X/diluter/HP-85 particle size measurement system in the FTF environment, acquire size distribution data to quantify the consistency of the Q107 aerosol size distribution at each FTF and among FTFs, and compare the FTF test aerosols to current and proposed standards. It is found that: (1) the LAS-X system can be operated successfully in the FTF environment: (2) each FTF requires a back up LAS-X to continue filter testing during the once each year removal of a LAS-X from service for major recalibration and repair: (3) the FTF test aerosols are not monodisperse and do not all meet the new nuclear standard, which a replacement aerosol would be required to meet; (4) the test aerosol at each FTF is quite consistent over time; and (5) the test aerosols at the three FTFs differ consistently. DOE

N85-13229# Los Alamos Scientific Lab., N. Mex.

A HIGH-REPETITION RATE, INDUCTIVELY STABILIZED, LONG-PULSE EXCIMER LASER

Robert C. Sze 1984 7 p refs Presented at the 5th Intern. Symp. on Gas Flow and Chem. Lasers, Oxford, 20 Aug. 1984 Submitted for publication
(Contract W-7405-eng-36)
(DE84-016827; LA-UR-84-2620; CONF-840899-1) Avail: NTIS HC A02/MF A01

A high-repetition rate double discharge head laser is developed taking advantage of the increased pulse repetition rate capabilities of inductive stabilization. DOE

N85-13230# Research Inst. of National Defence, Stockholm (Sweden).

LASER FOR DETERMINING THE IGNITION CONDITIONS OF A PYROTECHNIC MIXTURE

Henrik Oestmark Jun. 1984 40 p refs In SWEDISH; ENGLISH summary
(FOA-C-20542-D1; ISSN-0347-3694) Avail: NTIS HC A03/MF A01

The characterization of an explosive, subject to thermal stimulus, by a threshold ignition energy and a threshold ignition power was studied using a CO2 laser to heat a pyrotechnic mixture of magnesium and sodium nitrate at various power levels and various pulse widths. At short pulses the sensitivity can be characterized by a threshold ignition energy density and for long pulses by a threshold ignition flux. For pulse widths between the two extremes the ignition energy density is a function of the square root of the pulse width. The experimental results are validated by theoretically solving the heat flow equation. The method allows the ignition temperature, the absorption depth, the activation energy, and the frequency factor to be calculated. Author (ESA)

N85-13231# Paris-Sud Univ., Orsay (France). Lab. de Physique des Gaz et des Plasmas.

FOCUSING EFFECTS OF A LASER BEAM IN THE NON-RESONANT MULTIPHOTON IONIZATION (MPI) OF GASES

G. Baravian and G. Sultan Sep. 1984 44 p refs
(LP-207) Avail: NTIS HC A03/MF A01

A method to interpret the results of multiphoton ionization (MPI) experiments where there is no resonance and when saturation takes place is presented. A spatio-temporal intensity distribution of the laser beam in the interaction region is introduced. The calculations use Gaussian distributions but any other experimental distributions may be included. The calculation model was applied to hydrogen atoms; the MPI cross sections needed to illustrate the method were obtained using an empirical formula. The method determines the spatial distribution of the ionization rate, and the variations of this rate as a function of the peak intensity of the laser and the pulse duration. A method to determine the absolute value of the MPI cross sections in off resonance experiments with a better accuracy than the one usually obtained is outlined. Author (ESA)

N85-13232# Max-Planck-Inst. fuer Quantenoptik, Munich (West Germany).

IMPROVED SENSITIVITIES IN LASER INTERFEROMETERS FOR THE DETECTION OF GRAVITATIONAL WAVES

Roland Schilling, Lise Schnupp, David H. Shoemaker (MIT), Walter Winkler, Karl Maischberger, and Albrecht Ruediger Jul. 1984 13 p refs Presented at Journees Relativistes, Aussois, France, 2-5 May 1984 Submitted for publication
(MPQ-88) Avail: NTIS HC A02/MF A01

A 20 cm test Michelson interferometer was constructed inside the central vacuum tank of a 30 m apparatus, with separate suspension of the 2 near mirrors and of the simplified central block, now accommodating only the beam splitter and the Pockels cells. The resulting spectra are limited by shot noise only in a frequency range from 300 Hz to 8 kHz. This scheme was then applied to the 30 m interferometer, with 50 passes in the delay line (light path = 1.5 km). The output is still very close to shot noise in a frequency band from 1 to 8 kHz. Inside this band, the average noise in strain is 5 times 10 to the minus 19th power/sq root Hz. Author (ESA)

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N85-13233*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECT OF TWO INNER-RING OIL-FLOW DISTRIBUTION SCHEMES ON THE OPERATING CHARACTERISTICS OF A 35 MILLIMETER BORE BALL BEARING TO 2.5 MILLION DN
Fredrick T. Schuller, Stanley I. Pinel (Industrial Tectonics, Inc., Rancho Dominquez, Calif.), and Hans R. Signer (Industrial Tectonics, Inc., Rancho Dominquez, Calif.) Jan. 1985 14 p refs
(Contract NAS3-19779)
(NASA-TP-2404; E-2127; NAS 1.60:2404) Avail: NTIS HC A02/MF A01 CSCL 13I

Parametric tests were conducted with a 35-mm-bore, split-inner-ring ball bearing with a double-inner-land-guided cage. Provisions were made for through-the-inner-ring lubrication. Test condictions were either a thrust load of 667 N (150 lb) or a combined load of 667 N (150 lb) thrust and 222 N (50 lb) radial, shaft speeds from 32000 to 72000 rpm, and an oil-inlet temperature of 394 K (250 deg F). Outer ring cooling was used in some tests. Tests were run with either 50 or 75 percent of the total oil flow distributed to the inner-ring raceway. Successful operation was experienced with both 50% and 75% flow patterns to 2.5 million DN. Cooling the outer ring had little effect on inner-ring temperature; however, the outer-ring temperature decreased as much as 7% at 2.5 million DN. Maximum recorded power loss was 3.1 kW (4.2 hp), and maximum cage slip was 8.7 percent. Both occurred at a shaft speed of 72000 rpm, a lubricant flow rate of 1900 cu/min (0.50 gal/min), a combined load, and no outer-ring cooling. Author

N85-13234*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECT OF LUBRICANT EXTREME-PRESSURE ADDITIVES ON SURFACE FATIGUE LIFE OF AISI 9310 SPUR GEARS
Herbert W. Scibbe, Dennis P. Townsend, and Paul R. Aron Dec. 1984 14 p refs
(NASA-TP-2408; E-2042; NAS 1.60:2408) Avail: NTIS HC A02/MF A01 CSCL 13I

Surface fatigue tests were conducted with AISI 9310 spur gears using a formulated synthetic tetraester oil (conforming to MIL-L-23699 specifications) as the lubricant containing either sulfur or phosphorus as the EP additive. Four groups of gears were tested. One group of gears tested without an additive in the lubricant acted as the reference oil. In the other three groups either a 0.1 wt % sulfur or phosphorus additive was added to the tetraester oil to enhance gear surface fatigue life. Test conditions included a gear temperature of 334 K (160 F), a maximum Hertz stress of 1.71 GPa (248 000 psi), and a speed of 10,000 rpm. The gears tested with a 0.1 wt % phosphorus additive showed pitting fatigue life 2.6 times the life of gears tested with the reference tetraester based oil. Although fatigue lives of two groups of gears tested with the sulfur additive in the oil showed improvement over the control group gear life, the results, unlike those obtained with the phosphorus oil, were not considered to be statistically significant. R.J.F.

N85-13235*# Cummins Engine Co., Inc., Columbus, Ind.
ADVANCED AUTOMOTIVE DIESEL ASSESSMENT PROGRAM Final Report
R. Sekar and L. Tozzi Dec. 1983 354 p refs
(Contract DEN3-261)
(NASA-CR-168285; DOE/NASA/0261-1; NAS 1.26:168285; CTR-0747-84003) Avail: NTIS HC A16/MF A01 CSCL 13I

Cummins Engine Company completed an analytical study to identify an advanced automotive (light duty) diesel (AAD) power plant for a 3,000-pound passenger car. The study resulted in the definition of a revolutionary diesel engine with several novel features. A 3,000-pound car with this engine is predicted to give 96.3, 72.2, and 78.8 MPG in highway, city, and combined highway-city driving, respectively. This compares with current diesel powered cars yielding 41.7, 35.0, and 37.7 MPG. The time for 0-60 MPH acceleration is 13.9 sec. compared to the baseline of 15.2 sec. Four technology areas were identified as crucial in bringing this concept to fruition. They are: (1) part-load preheating, (2) positive displacement compounding, (3) spark assisted diesel combustion system, and (4) piston development for adiabatic, oilless diesel engine. Marketing and planning studies indicate that an aggressive program with significant commitment could result in a production car in 10 years from the date of commencement. For individual titles, see N85-13236 through N85-13244.

N85-13236*# Cummins Engine Co., Inc., Columbus, Ind.
ADVANCED AUTOMOTIVE DIESEL ASSESSMENT PROGRAM, EXECUTIVE SUMMARY Final Report
In its Advan. Automotive Diesel Assessment Program Dec. 1983 p 59 p refs (For primary document see N85-13235 04-37)
Avail: NTIS HC A16/MF A01 CSCL 13I

The objectives of this analytical study were: to select one advanced automotive diesel engine (AAD) concept which would increase the tank mileage of a 3,000 pound passenger car from the present 35 mpg to at least 52 mpg; to identify long term component research and development work required to bring the selected concept to fruition; and to prepare a development strategy that will bring the selected concept to a prototype testing phase. Cummins Engine Company has completed this study. The selected concept is a 4 stroke cycle, direct injection, spark assisted, advanced adiabatic diesel engine with positive displacement compounding plus expander and part load air preheating. The engine does not use a liquid coolant nor liquid lubricants. It is a 4 cylinder, in-line, 77 mm bore x 77 mm stroke, 1.434 liters displacement engine weighing 300 lb, and rated at 70 BHP at 3000 rpm. Installation dimensions are 621 mm length x 589 mm width x 479 mm height (24.4 inch x 22 inch x 18.9 inch). R.J.F.

N85-13237*# Cummins Engine Co., Inc., Columbus, Ind.
DETAILED PRFORMANCE ANALYSIS OF THE A.A.D. - CONCEPT B Final Report
R. Sekar and L. Tozzi *In its* Advan. Automotive Diesel Assessment Program Dec. 1983 46 p (For primary document see N85-13235 04-37)
Avail: NTIS HC A16/MF A01 CSCL 13I

New concepts for engine performance improvement are seen through the adoption of heat regeneration techniques; advanced methods to enhance the combustion; and higher efficiency air handling machinery, such as the positive displacement helical screw expander and compressor. Each of these concepts plays a particular role in engine performance improvement. First regeneration has a great potential for achieving higher engine thermal efficiency through the recovery of waste energy. Although the concept itself is not new (this technique is used in the gas turbine), the application to reciprocating internal combustion engines is quite unusual and presents conceptual difficulties. The second important area is better control of the combustion process in terms of heat transfer characteristics, combustion products, and heat release rate. The third area for performance improvement is in the adoption of high efficiency air handling machinery. In particular, positive displacement helical expander and compressor exhibit an extremely high efficiency over a wide range of operating conditions. R.J.F.

N85-13238*# Cummins Engine Co., Inc., Columbus, Ind.
ROLLER CROSSHEAD ANALYSIS Final Report
Donald Wilcock (Tribolock, Inc.) *In its* Advan. Automotive Diesel Assessment Program Dec. 1983 9 p (For primary document see N85-13235 04-37)
Avail: NTIS HC A16/MF A01 CSCL 13I

An analysis of the frictional behavior of a roller crosshead configuration is given. This configuration consists of a piston which carries at the wristpin position a roller of large diameter which can roll on the cylinder liner surfaces. A preliminary assessment is given of whether the roller can roll on the cylinder liner without skidding, and what, if any, are the tribological implications of this approach to a dry lubricated design. The rotational speed of the roller must change during the stroke if it is not to slip on the cylinder liner. The maximum value of angular acceleration occurs at top dead center and bottom dead center. If the traction force on the rim of the roller, which is the product of the normal force due to piston side load and the coefficient of friction, is not sufficient to drive the roller through the necessary angular acceleration, sliding will occur. At 1,000 rpm, it appears that there will be a definite area of slip near each end of the stroke. The length of the area of slip may be of the order of 1/8 inch at each of these points. R.J.F.

N85-13239*# Armstrong (W. G.), Whitworth and Co. Ltd., Slough (England).
A STUDY OF THE ARMSTRONG WHITWORTH SWING BEAM ENGINE FOR AUTOMOTIVE APPLICATION Final Report
In Cummins Engine Co., Inc. Advan. Automotive Diesel Assessment Program Dec. 1983 3 p (For primary document see N85-13235 04-37)
Copyright. Avail: NTIS HC A16/MF A01 CSCL 13I

The introduction of ceramics to those parts suffering high thermal loading was successfully demonstrated, and there is no question that the 100 kw (134 hp) naturally aspirated engine of the future will be developed to produce up to 300 kw (402 hp) by the application of turbocharging or its equivalent. However, at the 60 - 80 kw (80 - 107 hp) size needed for the economic automotive engine, scaling down the 300 kw (402 hp) is beset by the laws of scale. The conventional four stroke diesel was not shown to be successful at the small high speed engine size. The opposed piston two stroke engine does not suffer the same laws of scale and engines in the low power range have already been marketed successfully. The half liter/cylinder Armstrong Whitworth Swing Beam Engine is the latest to be designed with the automotive market in mind. Its low noise structure and balanced linkage system coupled with advantages for easy start and potential use of low grade fuels, derived from its variable compression ratio and slow piston motion, qualifies it for the application. R.J.F.

N85-13240*# Ford Motor Co., Dearborn, Mich.
ADVANCED AUTOMOTIVE DIESEL ENGINE SYSTEM STUDY Final Report
In Cummins Engine Co., Inc. Advan. Automotive Diesel Assessment Program Dec. 1983 18 p (For primary document see N85-13235 04-37)
Avail: NTIS HC A16/MF A01 CSCL 13I

A conceptual study of an advanced automotive diesel engine is discussed. The engine concept selected for vehicle installation was a supercharged 1.4 liter, 4 cylinder spark assisted diesel of 14:1 compression ratio. A compounding unit consisting of a Lysholm compressor and expander is connected to the engine crankshaft by a belt drive. The inlet air charge is heated by the expander exhaust gas via a heat exchanger. Four levels of technology achievement on the selected engine concept were evaluated, from state-of-the-art to the ideal case. This resulted in the fuel economy increasing from 53.2 mpg to 81.7 mpg, and the 0-60 mph time decreasing from 17.6 seconds to 10.9 seconds. R.J.F.

N85-13241*# Institute of Sound and Vibration Research, Southampton (England).
A.A.D. ENGINE NOISE EVALUATION Final Report
In Cummins Engine Co., Inc. Advan. Automotive Diesel Assessment Program Dec. 1983 29 p (For primary document see N85-13235 04-37)
Avail: NTIS HC A16/MF A01 CSCL 13I

A critique of the various characteristics of engine design influencing noise and attempts to indicator areas where attention is required to obtain noise acceptable engine for automobiles are discussed. It was concluded that the engine has a potential to be quiet beccause a ion rated speed is chosen. Problems with high gas pressure, the fuel injection pump, and the expander/compressor are discussed. R.J.F.

N85-13242*# Institute of Gas Technology, Chicago, Ill.
SCREW EXPANDER FOR LIGHT DUTY DIESEL ENGINES Final Report
In Cummins Engine Co., Inc. Advan. Automotive Diesel Assessment Program Dec. 1983 46 p refs (For primary document see N85-13235 04-37)
Avail: NTIS HC A16/MF A01 CSCL 13I

Preliminary selection and sizing of a positive displacement screw compressor-expander subsystem for a light-duty adiabatic diesel engine; development of a mathematical model to describe overall efficiencies for the screw compressor and expander; simulation of operation to establish overall efficiency for a range of design parameters and at given engine operating points; simulation to establish potential net power output at light-duty diesel operating points; analytical determination of mass moments of inertia for the rotors and inertia of the compressor-expander subsystem; and preparation of engineering layout drawings of the compressor and expander are discussed. As a result of this work, it was concluded that the screw compressor and expander designed for light-duty diesel engine applications are viable alternatives to turbo-compound systems, with acceptable efficiencies for both units, and only a moderate effect on the transient response. R.J.F.

N85-13243*# Cummins Engine Co., Inc., Columbus, Ind.
THERMAL AND MECHANICAL ANALYSIS OF MAJOR COMPONENTS FOR THE ADVANCED ADIABATIC DIESEL ENGINE Final Report
In its Advan. Automotive Diesel Assessment Program Dec. 1983 65 p (For primary document see N85-13235 04-37)
Avail: NTIS HC A16/MF A01 CSCL 13I

The proposed design for the light duty diesel is an in-line four cylinder spark assisted diesel engine mounted transversely in the front of the vehicle. The engine has a one piece cylinder head, with one intake valve and one exhaust valve per cylinder. A flat topped piston is used with a cylindrical combustion chamber recessed into the cylinder head directly under the exhaust valve. A single ceramic insert is cast into the cylinder head to insulate both the combustion chamber and the exhaust port. A similar ceramic insert is cast into the head to insulate the intake port. A ceramic faceplate is pressed into the combustion face of the head to insulate the face of the head from hot combustion gas. The valve seats are machined directly into the ceramic faceplate for the intake valve and into the ceramic exhaust pot insert for the exhaust valve. Additional ceramic applications in the head are the use of ceramic valve guides and ceramic insulated valves. The ceramic valve guides are press fit into the head and are used for increased wear resistance. The ceramic insulated valves are conventional valves with the valve faces plasma spray coated with ceramic for insulation. Author

N85-13244*# Cummins Engine Co., Inc., Columbus, Ind.
LONG TERM TECHNOLOGY DEVELOPMENT PROGRAM Final Report
R. Sekar and L. Tozzi *In its* Advan. Automotive Diesel Assessment Program Dec. 1983 7 p (For primary document see N85-13235 04-37)
Avail: NTIS HC A16/MF A01 CSCL 13I

In the Advanced Adiabatic Development program, the following technology were identified as critical: piston development for oil-less, adiabatic engine; positive displacement compounding and charge system; experimental evaluation of the preheat concept; combustion system with positive ignition assist; and ceramic manufacturing technology. Of these five areas, ceramic manufacturing technology is the pacing item, and is already being addressed by several organizations. Therefore the four remaining areas need immediate attention. Since the lead time involved in engine development and production is long, this technology development should be done concurrently with the AAD engine development. A four year program is outlined which will simultaneously study these first four areas. This program requires two test rigs; one single cylinder adiabatic engine; and one multicylinder adiabatic turbocompound engine. R.J.F.

N85-13245*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
EVALUATION OF HEAT ENGINE FOR HYBRID VEHICLE

APPLICATION
H. W. Schneider 31 Aug. 1984 72 p refs
(Contracts NAS7-918; DE-AI01-78CS-54209)
(NASA-CR-174163; JPL-Pub-84-14; JPL-5030-568; NAS 1.26:174163; DOE/CS-54209/155) Avail: NTIS HC A04/MF A01 CSCL 21A

The status of ongoing heat-engine developments, including spark-ignition, compression-ignition, internal-combustion, and external-combustion engines is presented. The potential of engine concepts under consideration for hybrid vehicle use is evaluated, using self-imposed criteria for selection. The deficiencies of the engines currently being evaluated in hybrid vehicles are discussed. Focus is on recent research with two-stroke, rotary, and free-piston engines. It is concluded that these engine concepts have the most promising potential for future application in hybrid vehicles. Recommendations are made for analysis and experimentation to evaluate stop-start and transient emission behavior of recommended engine concepts. Author

N85-13246# Royal Signals and Radar Establishment, Malvern (England).
HEAVY DUTY PRECISION PAN AND TILT HEAD
D. Bagshaw, M. R. Brown, I. Hansfield, and J. D. Roberts Apr. 1984 13 p Original contains color illustrations
(AD-A146669; RSRE-Memo-3691; BR92761) Copyright. Avail: NTIS HC A02/MF A01

The mechanical and electronic design of a heavy duty precision pan and tilt head driven by stepper motors and controlled by digital servos in both axes is outlined. The head can carry a load of 150 kg, can be positioned to 0.1 mR in either axis, can slew at 0.2 R/sec, and can be remotely controlled by position or velocity demands. The testing of the engineered head for repeatibility and frequency response is described. Suggestions for improving performance are made. Author (ESA)

N85-13247# Notre Dame Univ., Ind. Dept. of Metallurgical Engineering and Materials Science.
MICROSTRUCTURAL EFFECTS IN ABRASIVE WEAR Annual Progress Report, 12 Aug. 1983 - 14 Aug. 1984
T. H. Kosel 14 Aug. 1984 39 p refs
(Contract DE-AC02-81ER-10963)
(DE84-016155; DOE/ER-10963/2; APR-3) Avail: NTIS HC A03/MF A01

The two major goals of the project are to improve understanding of the mechanisms of carbide removal and of the role of matrix properties in abrasion. In the area of carbide removal mechanisms, progress included completion of the fixed depth scratch test apparatus and its use to demonstrate the occurrence of gross carbide cracking under fixed depth conditions; comparable cracking does not occur under fixed load conditions at a similar mean load. A high stress abrasion system was constructed and tested which will facilitate studies of abrasion under conditions similar to those produced by the fixed depth scratch test system. Analysis of the work on the size effect in abrasion of dual phase alloys was completed. The largest single item in this year's proposed work is a study of the abrasion resistance and mechanisms of material removal in model alloys having second phase particles (SPP's) with varying fracture properties. In the area of the effects of matrix properties on abrasion, the majority of the effort this year centered on transmission electron microscopy of the subsurface deformation microstructures developed during abrasion. DOE

N85-13248# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
DISSOCIATED METHANOL VEHICLE TEST RESULTS
Joseph G. Finegold May 1984 11 p refs Presented at the Intern. Symp. on Alcohol Fuels technol., Ottawa, Ontario, 21-25 May 1984
(Contract DE-AC02-83CH-10093)
(DE84-004507; SERI/TP-234-2245; CONF-840543-2) Avail: NTIS HC A02/MF A01

The results of chassis dynamometer testing of a 1980 Chevrolet Citation modified to run on dissociated methanol are presented. Data are presented on the composition of the dissociated methanol gas during steady-state operation, vehicle fuel consumption during steady-state and transient operation, and exhaust emissions during transient operation. During low speed, low load operation there are significant amounts of unconverted methanol and side products to the desired dissociation reaction. Despite this, fuel economy improvements over baseline gasoline operation are high. Fuel economies of 13.3 km/L (31.3 mpg) and 11.4 km/L (26.8 mpg) were obtained at steady speed road load conditions of 65 km/h and 90 km/h respectively. Methanol fuel economy over the EPA '74 CVS hot start city driving cycle was 7.74 km/L (18.2 mpg). Methanol fuel economy over the EPA highway fuel economy test was 10.2 km/L (24.0 mpg). DOE

N85-13249# Oak Ridge National Lab., Tenn. Energy Div.
IMPROVED ROBOTIC EQUIPMENT FOR RADIOLOGICAL EMERGENCIES
Conrad V. Chester Sep. 1984 57 p refs
(Contract DE-AC05-84OR-21400)
(DE84-017637; ORNL-6081) Avail: NTIS HC A04/MF A01

A study has been made of the requirements for an improved mobile manipulator for use by the US Department of Energy (DOE) in radiological emergencies. Emergency personnel with experience in past or present (Three Mile Island) radiological emergencies were interviewed to determine the shortcomings of present equipment and features most desired in future equipment. The present technology of mobile manipulators was reviewed. The existing DOE remotely controlled mobile manipulators are single-arm, nonforce-reflecting andhave inherent limitations to their mobility and ease of operation. A survey of past radiological emergencies and routine operation at DOE facilities and two commercial power reactors, including TIM, indicates that great improvements in mobility and manipulator dexterity will be required if mobile manipulators are to be more useful in reducing radiation exposure to operating and emergency personnel. In particular, the ability to climb stairs and climb over airlock thresholds is required. Bilateral, force-feedback manipulators would greatly increase the speed, reliability, and safety of manipulator operations. In recent years dramatic advances have been made in manipulator technology with the development of digital control and force feedback. DOE

N85-13250# Oak Ridge National Lab., Tenn. Fuel Recycle Div.
ADVANCEMENT OF REMOTE SYSTEMS TECHNOLOGY: PAST PERSPECTIVES AND FUTURE PLANS
M. J. Feldman and W. R. Hamel 1984 13 p refs Presented at the ANS Intern. Topical Meeting on Fuel Reprocessing and Waste Management, Jackson Hole, Wyo., 26-29 Aug. 1984
(Contract DE-AC05-84OR-21400)
(DE84-016710; CONF-840802-14) Avail: NTIS HC A02/MF A01

In the Consolidated Fuel Reprocessing Program at the Oak Ridge National Laboratory, a comprehensive remote systems development program has existed for the past five years. The new remote technology under development is expected to significantly improve remote operations by extending the range of admissible remote tasks and increasing remote work efficiency. The motivation and justification for the program are discussed by surveying the 40 years of remote operating experience which exists and considering the essential features of various old and new philosophies which were, or are being, used in remote engineering. A future direction based upon the Remotex concept is explained, and recent progress in the development of an advanced servo-manipulator-based maintenance concept is summarized to show that a new generation of remote systems capability is feasible through advanced technology. DOE

N85-13251# Monsanto Research Corp., Miamisburg, Ohio.
THERMAL SHOCK AS A CARBIDE GRADE DEVELOPMENT TOOL
C. W. Merten and B. F. vonTurkovich (Vermont Univ., Burlington) 1984 19 p refs
(Contract DE-AC04-76DP-00053)

(DE84-016939; MLM-3187(OP); CONF-840850-2) Avail: NTIS HC A02/MF A01

Objective improvement of quality through the maximization of signal to nose ratios is discussed. It is proposed that the signal to noise ratio concept also be applied to grade development of carbide tools for intermittent cutting. Thermal shock resistance is identified as a tool material property which might serve as a practical indicator of tool life for certain cutting conditions. Carbide specimens were subjected to single cycle thermal shock and statistical methods for the analysis of the resulting data are presented. Parameters for monitoring signal shift and signal to noise ratio are identified for the Weibull distribution. These parameters are then utilized for grade selection or grade prediction according to a proposed grade development strategy. DOE

N85-13252# Centre Technique des Industries Mecaniques, St. Etienne (France).
DESIGN OF A FLEXIBLE MACHINING SYSTEM Final Report [CONDUITE D'UNE CELLULE FLEXIBLE D'USINAGE]
Jean-Francois Coudurier Jan. 1984 130 p In FRENCH
(CETIM-1-3E-140) Avail: NTIS HC A07/MF A02

An automatic machining system was designed to operate with arbitrary sequences of axisymmetric pieces. The system is implemented with an inlet conveyor, a numerical controlled lathe, an outlet conveyor and a robot which assures the servicing of the various system elements. Control of machined pieces is carried out by a laser scanning meter. The computer programs and algorithms utilized are described. System management for real time operation is detailed. Author (ESA)

N85-13253# Centre Technique des Industries Mecaniques, Senlis (France).
THE MONITORING OF MACHINES Final Report [SURVEILLANCE DES MACHINES]
P. Coudray and M. Guesdon May 1983 26 p In FRENCH
(CETIM-15-J-041) Avail: NTIS HC A03/MF A01

The automatic diagnosis of gear reductor wear is developed using a combination of vibratory analysis and lubricating oil chemical analysis. The tests were performed on 20 gear reductors run to breakdown. An accelerometer produced the vibration signal, analyzed at three frequency bands. The spectra were obtained by Fourier analysis. The metallic particles in the lubricating oil were analyzed by emission spectroscopy and ferrography. The oil composition analysis characterizes the wear well, but is not efficient to forecast fatigue breakdowns. Vibration amplitude analysis indicates breakdown risk at 95% of the life cycle, while middle frequency band analysis indicates the component threatening breakdown. Author (ESA)

N85-13078# Hokkaido Univ., Sapporo (Japan).
EXPERIMENTAL STUDY ON THE GLOW PLUG AIDED ALCOHOL DRIVEN DIESEL ENGINE
Tadashi Murayama, Noboru Miyamoto, Takemi Chikahisa, and Hideyuki Ogawa *In its* Bull. of the Fac. of Eng., Hokkaido Univ., No. 123 Oct. 1984 p 27-41 In JAPANESE; ENGLISH summary (For primary document see N85-13075 04-31)
Avail: NTIS HC A05/MF A01

N85-13081# Hokkaido Univ., Sapporo (Japan).
ANALYSIS BASED ON REISSNER THEORY FOR RECTANGULAR PLATES WITH ALL EDGES BUILT-IN
Satoshi Otsu, Takeshi Uchiyama, and Yoshizo Dobashi *In its* Bull. of the Fac. of Eng., Hokkaido Univ., No. 123 Oct. 1984 p 77-89 refs In JAPANESE; ENGLISH summary (For primary document see N85-13075 04-31)
Avail: NTIS HC A05/MF A01

N85-13093# Joint Publications Research Service, Arlington, Va.
USE OF ROBOTICS IN HEAVY MACHINERY, EQUIPMENT CONSTRUCTION INDUSTRY
Rolf Kersten *In its* East Europe Rept.: Sci. and Technol. (JPRS-ESA-84-041) 20 Nov. 1984 p 56-58 Transl. into ENGLISH from Presse-Inform. (East Berlin), no. 83, 19 Jul. 1984 p 2 (For primary document see N85-13090 04-31)
Avail: NTIS HC A05/MF A01

N85-13094# Joint Publications Research Service, Arlington, Va.
ROBOTICS TECHNOLOGY APPLICATION ASSESSED, STATISTICS
In its East Europe Rept.: Sci. and Technol. (JPRS-ESA-84-041) 20 Nov. 1984 p 59-62 Transl. into ENGLISH from Presse-Inform. (East Berlin), no. 88, 31 Jul. 1984 p 5-6 (For primary document see N85-13090 04-31)
Avail: NTIS HC A05/MF A01

N85-13111# Joint Publications Research Service, Arlington, Va.
MATHEMATICAL MODELING OF ASSEMBLY PROCESSES INVOLVING USE OF SENSITIZED ROBOTS Abstract Only
A. A. Burtsev and V. I. Solntsev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 69 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Tekhn. Kibernetika (Moscow), no. 1, Jan. - Feb. 1984 p 148-157 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13112# Joint Publications Research Service, Arlington, Va.
OPTIMIZATION OF MOVEMENTS OF MANIPULATORS WITH KINEMATIC REDUNDANCY Abstract Only
A. A. Kaplunov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 70 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Tekhn. Kibernetika (Moscow), no. 1, Jan. - Feb. 1984 p 158-166 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13113# Joint Publications Research Service, Arlington, Va.
CONTROLLING ROTATION OF ELASTIC MANIPULATOR LINK Abstract Only
L. D. Akulenko and N. N. Bolotnik *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 70-71 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Tekhn. Kibernetika (Moscow), no. 1, Jan. - Feb. 1984 p 167-173 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13114# Joint Publications Research Service, Arlington, Va.
CONTROL OF LINEAR STATIONARY OBJECTS SUBJECT TO EXTERNAL ACTIONS BY MEANS OF VARIOUS TYPES OF FEEDBACK Abstract Only
S. V. Yemelyanov, S. K. Korovin, and B. V. Ulanov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 71-72 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Tekhn. Kibernetika (Moscow), no. 1, Jan. - Feb. 1984 p 174-182 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13127# Joint Publications Research Service, Arlington, Va.
DEVELOPMENTS IN SOVIET ROBOT TECHNOLOGY VIEWED
V. B. Alekseyev and L. M. Rudskiy *In its* USSR Rept.: Machine Tools and Metalworking Equipment (JPRS-UMM-84-020) 23 Nov. 1984 p 48-52 Transl. into ENGLISH from Stroit. i Dorozh. Mashiny (Moscow), no. 7, Jul. 1984 p 2-3 (For primary document see N85-13126 04-31)
Avail: NTIS HC A05

N85-13128# Joint Publications Research Service, Arlington, Va.
SOVIET ROBOT EXHIBITION REVIEWED
N. P. Oleynikova *In its* USSR Rept.: Machine Tools and Metalworking Equipment (JPRS-UMM-84-020) 23 Nov. 1984 p 53-56 Transl. into ENGLISH from Mashinostroitel (Moscow), no. 7, Jul. 1984 p 45-46 (For primary document see N85-13126 04-31)
Avail: NTIS HC A05

N85-13129# Joint Publications Research Service, Arlington, Va.
DEVELOPMENT, NEW APPLICATION OF SOVIET ROBOTS
B. A. Tyutin, L. V. Voroshnina, and L. V. Polosin *In its* USSR Rept.: Machine Tools and Metalworking Equipment (JPRS-UMM-

84-020) 23 Nov. 1984 p 65-68 Transl. into ENGLISH from Tekhnol. i Organizatsiya Proizv. (Kiev), no. 3, Mar. 1984 p 19-21 (For primary document see N85-13126 04-31)
Avail: NTIS HC A05

N85-13130# Joint Publications Research Service, Arlington, Va.
DNC, CNC NETWORK FOR ROBOTIZED MACHINING CELLS
N. I. Dmitriyev, A. A. Yurchenkov, and P. P. Zuyev *In its* USSR Rept.: Machine Tools and Metalworking Equipment (JPRS-UMM-84-020) 23 Nov. 1984 p 71-74 Transl. into ENGLISH from Mekhaniz. i Avtomat. Proizv. (Moscow), no. 5, May 1984 p 5-6 (For primary document see N85-13126 04-31)
Avail: NTIS HC A05

N85-13134# Joint Publications Research Service, Arlington, Va.
DEVELOPMENT OF ROBOT TECHNOLOGY IN SHANGHAI SURVEYED
Lu Xueshi and Xu Huichang *In its* China Rept.: Sci. and Technol. (JPRS-CST-84-003) 2 Feb. 1984 p 11-23 Transl. into ENGLISH from Zuhe Jichuang (Dalian), no. 5, 1983 p 27-32 (For primary document see N85-13132 04-31)
Avail: NTIS HC A03/MF A01

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N85-13254# Argonne National Lab., Ill. Materials Science and Technology Div.
ULTRASONIC AND METALLURGICAL EXAMINATION OF A CRACKED TYPE 304 STAINLESS STEEL BWR PIPE WELDMENT
J. Y. Park and D. Kupperman Jan. 1984 24 p refs
(Contract NRC-FIN-A2212)
(TI84-014968; NUREG/CR-3894) Avail: NTIS HC A02/MF A01

An ultrasonic in-service inspection (ISI) indicated that a crack developed in a 22-inch-diameter Type 304 stainless steel pipe manifold end-cap weldment of the Hatch-2 boiling water reactor. A section of the weldment was sent to Argonne National Laboratory (ANI) for further examination. The ANI effort included ultrasonic examination, destructive crack-depth measurements, metallography, degree of sensitization (DOS) measurements, and chemical analyses of material. The results showed that the extent of the cracking was significantly less than indicated by the ISI. DOE

N85-13255# Sandia Labs., Albuquerque, N. Mex.
DETERMINATION SAMPLE SIZES FOR DIVERSIFIED RELIABILITY TEST PROGRAMS
F. W. Mueller Jun. 1984 16 p refs
(Contract DE-AC04-76DP-00789)
(DE84-015003; SAND-83-1034) Avail: NTIS HC A02/MF A01

Criteria for planning test programs that consist of diversified types of tests were developed. Criteria using classical confidence limits are developed first, based upon the classification of failure mechanisms in terms of the number of tests that provide opportunities for their observation. The classical criteria suffer because of the small numbers of opportunities afforded some classes of failure mechanisms to display themselves. Additional criteria are developed that use generic test experience in an empirical bayes sense. DOE

N85-13256# Los Alamos Scientific Lab., N. Mex.
DEVELOPMENT OF A DYNAMIC RADIOGRAPHIC CAPABILITY USING HIGH-SPEED VIDEO
Lawrence E. Bryant, Jr. 1984 7 p refs Presented at the 16th Intern. Congr. on High Speed Photography and Photonics, Strasbourg, 27-31 Aug. 1984
(Contract W-7405-eng-36)
(DE84-016477; LA-UR-84-2540; CONF-840887-10) Avail: NTIS HC A02/MF A01

High-speed video equipment can be used to optically image up to 200 full frames per second or 12,000 partial frames per second. X-ray image intensifiers have historically been used to image radiographic images at 30 frames per second. By combining these two types of equipment, it is possible to perform dynamic X-ray imaging of up to 2,000 full frames per second. The technique has been demonstrated using conventional, industrial X-ray sources. A crude form of this high-speed radiographic imaging was shown to be possible with a cobalt 60 source. Use of maximum aperture lens makes best use of the available light output from the image intensifier. The X-ray image intensifier input and output fluors decay rapidly enough to allow the high frame rate imaging. Data are presented on the maximum possible video frame rates versus X-ray penetration of various thicknesses of aluminum and steel. Video recordings show several demonstrations of this technique withth played-back X-ray images slowed down up to 100 times as compared to the actual event speed. Typical applications include boiling type action of liquids in metal containers, compressor operation with visualization of crankshaft, connecting rod and piston movement and thermal battery operation. DOE

N85-13257# Centre National d'Etudes Spatiales, Toulouse (France). Direction des Lanceurs.
QUALITY ORGANIZATION [L'ORGANISATION DE LA QUALITE]
Claude Petitdemange Apr. 1983 139 p refs In FRENCH; ENGLISH summary
(CNES-NT-106) Avail: NTIS HC A07/MF A01

The goals, means and organization of quality control are discussed. Quality manuals, corrective and preventive actions, control planning, and quality audits are described. Author (ESA)

N85-13258# Centre National d'Etudes Spatiales, Toulouse (France). Centre Spatial.
COMPONENT RELIABILIITY AND ASSEMBLING TECHNOLOGIES [FIABILITE COMPOSANTS ET TECHNOLOGIES D'ASSEMBLAGE]
Francois Linder Sep. 1983 68 p refs In FRENCH; ENGLISH summary
(CNES-NT-108) Avail: NTIS HC A04/MF A01

Space application electronic packaging procedures are discussed. Activities in project support, technical studies and evaluation-qualification are detailed. Electronic packaging options are described. Author (ESA)

N85-13259# European Space Agency. European Space Research and Technology Center, ESTEC, Noordwijk (Netherlands). Product Assurance Div.
THE ESA PRODUCT ASSURANCE SPECIFICATION SYSTEM: EXPLANATORY NOTE
6 Jul. 1984 15 p
Avail: NTIS HC A02/MF A01

The ESA product assurance specifications were rewritten and reidentified to fit into a three-level structure. The ESA PSS-01-0 contains the basic requirements for product assurance and is the only document in the top level, i.e., level 1. Level 2 comprises 9 disciplines, each of which expands into detailed requirements one of the major disciplines covered more generally in PSS-01-0. The remainder of the specifications are in level 3 and are intended as supporting specifications which cover methods, special processes, data, etc. They can be direct extensions of requirements in the level 2 specifications. Author (ESA)

N85-13260# Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
DEFECT DETECTION THRESHOLD IN RIVETED JOINTS, TEST REPORT NO.44-833/F [SEUIL DE DETECTABILITE DES DEFAUTS DANS LES ASSEMBLAGES RIVES, PROCES-VERBAL NO.44-833/F]
D. Lecuru 2 Feb. 1984 195 p In FRENCH
(Contract STPA-80.96.025)
Avail: NTIS HC A09/MF A01

The utilization of ultrasonic and Foucault currents for the detection of fatigue cracks in rivet holes is studied in order to determine the levels of detection thresholds and assured detection. Longitudinal aluminum riveted joints of the type used in aircraft structures were tested by operators with different training levels. The apparatus and control methods are described. It is shown that the detection level is significantly dependant on operator expertise. Author (ESA)

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

N85-13261 National Physical Lab., Teddington (England). Div. of Materials Applications.

NON-LINEAR DATA FITTING FOR THE ANALYSIS OF CREEP RUPTURE DATA ON GRP MATERIALS IN AGGRESSIVE ENVIRONMENTS

A. Woolf Jun. 1984 22 p refs

(NPL-DMA(A)-79; ISSN-0143-7313) Copyright. Avail: Issuing Activity

A nonlinear optimization routine, which finds the unconstrained minimum of the sum of squares of M nonlinear functions in N variables, was used to calculate a constant involving specimen geometry and initial flaw size (K) the exponenent of the crack growth low (n) and the limiting strength under short term loads (m) for creep rupture data on sets of glass reinforced plastics (GRP) and environments. For each set, K, n, and m are found such that the set of M data points are fitted as closely as possible. The model was used to predict short term failure stress of GRP and long term performance under stress in water and in 1N H2SO4. Author (ESA)

N85-13262 National Physical Lab., Teddington (England). Div. of Materials Applications.

LARGE TRANSVERSE DEFLECTIONS OF CIRCULAR PLATES LOADED SYMMETRICALLY

D. H. Ferriss Sep. 1984 43 p refs

(NPL-DMA(A)-86; ISSN-0143-7313) Copyright. Avail: Issuing Activity

Differential equations representing the equilibrium of circular plates subjected to symmetric lateral loading in which bending and membrane forces are taken into account are presented. A simply supported edge with zero membrane stress, a simply supported edge with zero membrane displacement, and a clamped edge with zero membrane displacement are considered together with uniform, disk and ring loading conditions. The equations are solved numerically using a finite difference technique. As deflections increase, it is shown how the solutions tend to those given by the membrane problem in which bending effects are ignored. The general membrane problem is also treated numerically and a series solution for the uniformly loaded case is developed. Author (ESA)

N85-13263 Forschungsinstitut fuer Hochfrequenzphysik, Werthhoven (West Germany).

A DYNAMICAL MODEL FOR A TOWED LINEAR SONAR ANTENNA

W. Brandenburg Jun. 1984 35 p refs In GERMAN; ENGLISH summary

(Contract BMVg-FOAT-T/R-37; D-00-15/D-13-15)

(Rept-6-84; Lfd-225) Copyright. Avail: Issuing Activity

A point mechanical model for towed arrays is developed. The equations of motion are derived using the Lagrange formalism of classical mechanics. Two examples show the bearing and depth at various points of the towed array as a function of time while the ship changes the course. An optimal course, which minimizes the curvature of the array is shown. The response time of the towed array after a change of course is determined. Author (ESA)

N85-13264*# Houston Univ., Tex. Dept. of Mechanical Engineering.

NONDESTRUCTIVE EVALUATION OF RESIDUAL STRESS IN LOW-CARBON STEEL Final Report

Kamel Salama Oct. 1984 26 p refs

(Grant NAG1-388)

(NASA-CR-174157; NAS 1.26:174157) Avail: NTIS HC A03/MF A01 CSCL 20K

The effects of the preferred orientation on the temperature dependence of ultrasonic velocity in low carbon steels are investigated. The sensitivity of the acousto-elastic constant to changes in microstructure is assessed as well as the possibility of determining some mechanical properties of a material by measuring the acousto-elastic constant. For individual titles, see N85-13265 through N85-13266.

N85-13265*# Houston Univ., Tex. Dept. of Mechanical Engineering.

NONDESTRUCTIVE EVALUATION OF RESIDUAL STRESS IN LOW-CARBON STEEL, INTRODUCTION Final Report

In its Nondestructive Evaluation of Residual Stress in Low-Carbon Steel Oct. 1984 14 p refs (For primary document see N85-13264 04-39)

Avail: NTIS HC A03/MF A01 CSCL 20K

The degree of insensitivity of the temperature dependence method to variations in preferred orientations in A508 low carbon steel specimens was determined. A pulsed phase locked loop was used to measure ultrasonic velocity in these specimens in the temperature range of 50 C below and above room temperature. Results are given in tables and indicate that the temperature dependence of ultrasonic longitudinal velocity in four specimens cut at different angles remains unchanged as a function of orientation within + or -2%. The variation of temperature dependence of ultrasonic shear velocity in the A508 steel as a function of applied stresses was also measured. Results show that values at zero stress are equal regardless of whether the polarization direction is parallel or perpendicular to the direction in which the stress is applied. A.R.H.

N85-13266*# Houston Univ., Tex. Dept. of Mechanical Engineering.

NONDESTRUCTIVE DETERMINATION OF MECHANICAL PROPERTIES Final Report

Eckhardt Schneider (Saarlandes Univ., Saarbruecken, West Germany), Shyr-Liang Chu, and Kamel Salma *In its* Nondestructive Evaluation of Residual Stress in Low-Carbon Steel Oct. 1984 9 p refs (For primary document see N85-13264 04-39)

Avail: NTIS HC A03/MF A01 CSCL 20K

Aluminum alloys of types 1100, 3003, 5052, 6061, and 2024 were used to study the sensitivity of the acousto-elastic constant to changes in the microstructure. Results show that there is a strong relationship between the acousto-elastic constants and the yield strength and hardness. This relationship depends on whether the alloy is strain hardened or precipitation hardened. In strain hardened alloys, the constants increase as the amount of solid solution is decreased, while the behavior is the opposite in precipitation hardened alloys. A.R.H.

N85-13267*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

FULL-SCALE CRASH-TEST EVALUATION OF TWO LOAD-LIMITING SUBFLOORS FOR GENERAL AVIATION AIRFRAMES

Huey D. Carden Dec. 1984 60 p refs

(NASA-TP-2380; L-15764; NAS 1.60:2380) Avail: NTIS HC A04/MF A01 CSCL 20K

Three six place, low wing, twin engine general aviation airplane test specimens were crash tested at the Langley Impact Dynamics Research Facility under controlled free flight conditions. One structurally unmodified airplane was the base line specimen for the test series. The other two airplanes were structurally modified to incorporate load limiting (energy absorbing) subfloor concepts into the structure for full scale crash test evaluation and for comparison with the unmodified airplane test results. Typically, the lowest floor accelerations, the lowest anthropomorphic dummy responses, and the least seat crushing of standard and load limiting seats occurred in the airplanes modified with load limiting subfloors, wherein the greatest structural crushing of the subfloor took place. The better performing of the two load limiting subfloor concepts reduced the peak airplane floor accelerations to -25g to -30g as compared with approximately -40g to -55g for the unmodified airplane structure. Author

N85-13268*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A BUCKLING ANALYSIS FOR RECTANGULAR ORTHOTROPIC PLATES WITH CENTRALLY LOCATED CUTOUTS
Michael P. Nemeth Dec. 1984 44 p refs
(NASA-TM-86263; L-15784; NAS 1.15:86263) Avail: NTIS HC A03/MF A01 CSCL 20K

An analysis to obtain the buckling loads of a rectangular orthotropic plate with a centrally located cutout is described. Cutout shapes can be elliptical, circular, rectangular, or square. The boundary conditions considered in the analysis are simply supported unloaded edges and either clamped or simply supported loaded edges. The plate is loaded in uniaxial compression by either uniform edge displacement or uniform edge stress. A computer program that implements this analysis is described, and the program use is demonstrated by sample problems. Author

N85-13269*# Boeing Commercial Airplane Co., Seattle, Wash.
FLUTTER PARAMETRIC STUDIES OF CANTILEVERED TWIN-ENGINE-TRANSPORT TYPE WING WITH AND WITHOUT WING-LET. VOLUME 1: LOW-SPEED INVESTIGATIONS Final Report, Dec. 1983 - Sep. 1984
Kumar G. Bhatia and K. S. Nagaraja Sep. 1984 95 p refs
(Contract NAS1-17539)
(NASA-CR-172410-Vol-1; NAS 1.26:172410-Vol-1) Avail: NTIS HC A05/MF A01 CSCL 20K

Flutter characteristics of a cantilevered high aspect ratio wing with winglet were investigated. The configuration represented a current technology, twin-engine airplane. A low-speed and high-speed model were used to evaluate compressibility effects through transonic Mach numbers and a wide range of mass-density ratios. Four flutter mechanisms were obtained in test, as well as analysis from various combinations of configuration parameters. The coupling between wing tip vertical and chordwise motions was shown to have significant effect under some conditions. It is concluded that for the flutter model configurations studied, the winglet related flutter was amenable to the conventional flutter analysis techniques. B.W.

N85-13270*# Boeing Commercial Airplane Co., Seattle, Wash.
FLUTTER PARAMETRIC STUDIES OF CANTILEVERED TWIN-ENGINE TRANSPORT TYPE WING WITH AND WITHOUT WING-LET. VOLUME 2: TRANSONIC AND DENSITY EFFECT INVESTIGATIONS Final Report, Dec. 1983 - Sep. 1984
Kumar G. Bhatia and K. S. Nagaraja Sep. 1984 144 p refs
(Contract NAS1-17539)
(NASA-CR-172410-Vol-2; NAS 1.26:172410-Vol-2) Avail: NTIS HC A07/MF A01 CSCL 20K

Flutter characteristics of a cantilevered high aspect ratio wing with winglet were investigated. The configuration represented a current technology, twin engine airplane. Compressibility effects through transonic Mach numbers and a wide range of mass-density ratios were evaluated on a low speed and high speed model. Four flutter mechanisms were obtained from test, and analysis from various combinations of configuration parameters. It is shown that the coupling between wing tip vertical and chordwise motions have significant effect under some conditions. It is concluded that for the flutter model configurations studied, the winglet related flutter is amenable to the conventional flutter analysis techniques. The low speed model flutter and the high-speed model flutter results are described. E.A.K.

N85-13271# California Univ., Davis. Dept. of Mechanical Engineering.
CAVITATION PHENOMENON IN SUPERPLASTIC CREEP Progress Report, 1 Nov. 1982 - 30 Nov. 1983
A. K. Mukhejree 1983 21 p refs
(Contract DE-AT03-79ER-10508)
(DE84-015484; DOE/ER-10508/T1) Avail: NTIS HC A02/MF A01

Superplastic cavitation and fracture often form limiting conditions for superplastic processing. The 7475 aluminum alloy was selected for this investigation. The as-received alloy was heat treated in order to obtain a range of grain size and was tested in a controlled atmosphere in order to study the level of cavitation as a function of temperature, strain-rate, and true strain. Results from mechanical testing were supplemented by microstructural investigations using optical metallography, scanning, and transmission electron microscopy and density measurements. DOE

N85-13272# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
RESPONSE OF FERRITIC STEELS TO NONSTEADY LOADING AT ELEVATED TEMPERATURES
R. W. Swindeman 1 Apr. 1984 38 p refs Presented at the ASME Pressure Vessel and Piping Conf., San Antonio, 17 Jun. 1984
(Contracts DE-AC05-84OR-21400; W-7405-eng-26)
(DE84-014280; CONF-840647-23-Draft) Avail: NTIS HC A03/MF A01

High-temperature operating experience is lacking in pressure vessel materials that have strength levels above 586 MPa. Because of their tendency toward strain softening, their behavior under nonsteady loading caused concern. Testing was undertaken to explore the extent of softening produced by monotonic and cyclic strains. The specific materials included bainitic 2 1/4Cr-1Mo steel, a micro-alloyed version of 2 1/4Cr-1Mo steel, a micro-alloyed version of 2 1/4Cr-1Mo steel containing vanadium, titanium, and boron, and a martensitic 9Cr-1Mo-V-Nb steel. Tests included tensile, creep, variable stress creep, relaxation, strain cycling, stress cycling, and non-isothermal creep ratchetting experiments. It was found that these steels had very low uniform elongation and exhibited small strains to the onset of tertiary creep compared to annealed 2 1/4Cr-1Mo steel. Repeated relaxation test data also indicated a limited capacity for strain hardening. Reversal strains produced softening. The degree of softening increased with increased initial strength level. It was concluded that the high strength bainitic and martensitic steels should perform well when used under conditions where severe cyclic operation does not occur. DOE

N85-13273# Brookhaven National Lab., Upton, N. Y.
IN-SITU STRESS RELIEF OF EXPANDED ALLOY 600 STEAM GENERATOR TUBING
J. Woodward, D. vanRooyen, and A. R. McIlree (EPRI, Palo Alto, Calif.) 1984 6 p refs Presented at the Intern. Congr. on Metallic Corrosion, Toronto, 3 Jun. 1984
(Contract DE-AC02-76CH-00016)
(DE84-014560; BNL-34978; CONF-840664-7) Avail: NTIS HC A02/MF A01

Stress corrosion cracking which is the most common cause of defects in steam generator tubing is discussed. The problem of intergranular stress corrosion cracking, initiated on the primary side, in the expansion transition region of roller expanded Alloy 600 tubing is examined. It is believed that residual stresses which arise from the expansion process, are the cause of the problem. The identification and implementation of an optimal, in situ stress relief treatment, is discussed. DOE

N85-13274# State Univ. of New York, Stony Brook. Dept. of Materials Science and Engineering.
APPLICATIONS OF SYNCHROTRON X-RAY DIFFRACTION

TOPOGRAPHY TO FRACTOGRAPHY
J. C. Bilello 1983 10 p refs Presented at the Joint Meeting of American Crystallographic Association and Denver X-ray Conf., Snowmass, Colo., 1 Aug. 1983
(Contract DE-FG02-84ER-45098)
(DE84-016257; DOE/ER-45098/2; CONF-830887-5) Avail: NTIS HC A02/MF A01

Fractographs were taken by using a variety of probes each of which produces different types of information. Methods which were used to examine fracture surfaces include: (1) optical microscopy, particularly interference contrast methods; (2) scanning electron microscopy (SEM); (3) SEM with electron channelling; (4) SEM with selected area electron channelling; (5) Berg-Barrett (B-B) topography; and (6) synchrotron X-radiation fractography (SXRF). The role of X-ray methods in such studies is reviewed. The ability to assess fracture to depths of the order of 5 to 10 (MU)m becomes an important attribute for obsevations of a large class of semibrittle metals, semiconductors and ceramics. DOE

N85-13275# Sandia Labs., Albuquerque, N. Mex. Digital Systems Development Div.
VIBRATION DATA ANALYSIS SYSTEM FOR SNLA AREA 3 REFERENCE MANUAL
Thomas L. Downey and Robert N. Tomlinson Jun. 1984 138 p
(Contract DE-AC04-76DP-00789)
(DE84-016207; SAND-84-0350) Avail: NTIS HC A07/MF A01

This reference manual describes a computer system developed for vibration data acquisition and analysis. The system is capable of digitizing random, transient, and sine sweep vibration environments and providing completely labeled, high-resolution plots and records of the analysis parameters, channel calibrations, and transducer identifications. Special features of the system include the use of computer terminal forms for entry of the analysis parameters, the scheduling of the acquisition and analysis programs using terminal function keys, and the complete automation of the data acquisition hardware. DOE

N85-13276# Ames Lab., Iowa.
ULTRASOUND INTERACTION WITH PARTIALLY CLOSED FATIGUE CRACKS
O. Buck and R. B. Thompson 1984 11 p refs Presented at the 2nd Intern. Conf. on Fatigue Thresholds, Birmingham, England
(Contract W-7405-eng-82)
(DE84-016360; IS-M-501; CONF-8409121-1) Avail: NTIS HC A02/MF A01

Partial contact of two rough fatigue crack surfaces leads to transmission and diffraction of an acoustic signal at those contacts. Recent experimental and theoretical efforts to quantify such contact in greater detail are discussed in order to: (1) develop an understanding of the closure phenomenon and its application to the interpretation of fatigue data, in particular R-ratio, spike overload/underload, and environmental effects on crack propagation and (2) obtain an understanding of the effects of closure on the detection probability of fatigue cracks, which reflects strongly on the capability for accurate life prediction. DOE

N85-13277# California Univ., Livermore. Lawrence Livermore Lab.
NIKE3D: AN IMPLICIT, FINITE-DEFORMATION, FINITE ELEMENT CODE FOR ANALYZING THE STATIC AND DYNAMIC RESPONSE OF THREE-DIMENSIONAL SOLIDS, REVISION 1
J. O. Hallquist Jul. 1984 85 p refs
(Contract W-7405-eng-48)
(DE84-017161; UCID-18822-Rev-1) Avail: NTIS HC A05/MF A01

A user's manual for NIKE3D, a fully implicit three-dimensional finite element code for analyzing the finite strain static and dynamic response of inelastic solids, shells, and beams, is provided. A contact-impact algorithm permits gaps and sliding along material interfaces. By a specialization of this algorithm, these interfaces can be rigidly tied to admit variable zoning without the need of transition regions. Spatial discretization is achieved by the use of 8-node constant pressure solid elements, 2-node truss and beam elements, and 4-node membrane and shell elements. Bandwidth minimization is optional. DOE

N85-13278# Sandia Labs., Albuquerque, N. Mex.
COMPARISON OF FREE COMPONENT MODE SYNTHESIS TECHNIQUES USING MSC/NASTRAN
D. R. Martinez and D. L. Gregory Jun. 1984 25 p refs
(Contract DE-AC04-76DP-00789)
(DE84-014451; SAND-83-0025) Avail: NTIS HC A02/MF A01

The MSC/NASTRAN program was used to compare three techniques of component mode synthesis (CMS) using free modes. A free-free beam model was analyzed by the three methods and compared to the finite element results for the entire beam. The three CMS techniques use different combinations of assumed displacement vectors. Two of the techniques are available as standard options within MSC/NASTRAN. The third uses residual terms and is ideally suited to using results from an experimental data base to describe a portion of the model. For this technique, the effects of including residual terms only in the stiffness matrix or in both the mass and stiffness matrices, as well as neglecting the off-diagonal residual terms were studied. Significant divergence of low-frequency system modes was obtained when using one technique while excellent and identical convergence was obtained using the other two. Results are given for modal frequency convergence, mode shape correlation, and mode shape convergence. DOE

N85-13279# Aeronautical Research Inst. of Sweden, Stockholm. Structures Dept.
STRESS INTENSITY FACTORS FOR CORNER CRACKS AT HOLES LOCATED NEAR AN EDGE
Dag Wiklander Aug. 1984 137 p refs
(Contract FMV-FlygFl-82223-80-183-21-001)
(FFA-TN-1984-20) Avail: NTIS HC A07/MF A01

The general purpose finite element code BASIS was used to calculate the variation of the mode I stress intensity factor KI along the crack front for a quarter-elliptical crack at a hole in a plate. Results of KI as function of plate thickness, distance between hole and plate edge, crack ellipticity, and crack size are given for 15 basic loading cases. Values of KI obtained differ 2% or less from the true values. A FORTRAN-module which utilizes the data base created and allows for quick interpolation between data obtained was developed. Author (ESA)

N85-13280# Centre Technique des Industries Mecaniques, Senlis (France).
FORMULATION AND SOLUTION METHODS FOR CLASSICAL PROBLEMS OF STATIC BUCKLING Final Report [FORMULATIONS ET METHODES DE RESOLUTION DES PROBLEMES CLASSIQUES DU FLAMBAGE STATIQUE]
Michel Dubois Oct. 1983 55 p refs In FRENCH
(CETIM-101010) Avail: NTIS HC A04/MF A01

Fundamental equilibrum nonlinear equations are treated by classical incremental methods for the solution of nonlinear systems, including the Newton-Raphson procedures, the Riks method which assures an automatic progression along the equilibrium path, the asymptotic Koiter method, and adaptation of the Koiter method to the finite element method and linearized simplified methods. With a conservative loading the static methods are justified, and in the presence of elastic behavior the Koiter stability theory is applicable. If the materials are not entirely elastic, the most promising method is a Rayleigh-Ritz finite element iterative method. Author (ESA)

N85-13281# Centre Technique des Industries Mecaniques, Senlis (France).
NONLINEAR DEFORMATION AND STATIC LINEAR BUCKLING OF STRUCTURES UNDER PRESSURE Final Report [DEFORMATIONS NON-LINEAIRES ET FLAMBAGE STATIQUE LINEAIRE DE STRUCTURES SOUMISES A DES FORCES DE PRESSION]
Y. Ousset Apr. 1983 33 p refs In FRENCH
(CETIM-11-E-350) Avail: NTIS HC A03/MF A01

The Euler buckling of structures under conservative pressure loading, such as an immersed tank, is computed by a procedure in which the pressure forces, which are a nonlinear function of the displacement, are treated as a linear plus a quadratic term. The results are extended to the case of a reservoir containing an incompressible fluid with a free surface. The Ahmad superparametric thick plate element, a degenerated three dimensional element, is used with the CASTOR SD program. Author (ESA)

N85-13282# Centre Technique des Industries Mecaniques, St. Etienne (France).
TEST METHODS FOR CABLE CARS Final Report [METHODE D'ESSAIS DE TELECABINES]
E. Babaud Feb. 1983 24 p In FRENCH
(CETIM-1-5K-45-1) Avail: NTIS HC A02/MF A01

A cable car test method consisting of excitation with a random multifrequency Gaussian load with a given bandwidth and measuring system response at a single point is proposed. The study was done to improve winter sport transport equipment test procedures, which are limited to sinusoidal loads. The Locati fatigue method increases the load by steps till structural failure. The number of cycles of each step is determined as a function of the material Wohler curves. Author (ESA)

N85-12976*# Rensselaer Polytechnic Inst., Troy, N. Y.
INITIAL SAILPLANE PROJECT: THE RP-1
In its Composite Struct. Mater. Aug. 1984 p 147 (For primary document see N85-12966 04-24)
Avail: NTIS HC A08/MF A01 CSCL 20K

N85-12977*# Rensselaer Polytechnic Inst., Troy, N. Y.
SECOND SAILPLANE PROJECT: THE RP-2
In its Composite Struct. Mater. Aug. 1984 p 149-154 (For primary document see N85-12966 04-24)
Avail: NTIS HC A08/MF A01 CSCL 20K

N85-13076# Hokkaido Univ., Sapporo (Japan).
ESTIMATION OF DYNAMIC STRESSES AROUND THE SHOT POINT BY SCALE MODEL EXPERIMENT
Masuyuki Ujihira and Hiroshi Shimauchi *In its* Bull of the Fac. of Eng., Hokkaido Univ., No. 123 Oct. 1984 p 1-14 refs In JAPANESE; ENGLISH summary (For primary document see N85-13075 04-31)
Avail: NTIS HC A05/MF A01

N85-13079# Hokkaido Univ., Sapporo (Japan).
IMPLICATION STRUCTURES FOR GENERALIZED IMPLICATION MATRIX IN ISM
Satoshi Kase, Azuma Ohuchi, Masahito Kurihara, and Ikuo Kaji *In its* Bull. of the Fac. of Eng., Hokkaido Univ., No. 123 Oct. 1984 p 43-53 refs In JAPANESE; ENGLISH summary (For primary document see N85-13075 04-31)
Avail: NTIS HC A05/MF A01

42 GEOSCIENCES (GENERAL)

N85-13283# Geological Survey, Alexandria, Va.
THE UNITED STATES GEOLOGICAL SURVEY IN ALASKA: ACCOMPLISHMENTS DURING 1981
Warren L. Coonrad, ed. and Raymond L. Elliott, ed. 1984 175 p refs
(USGS-Circ-868; LC-76-608093) Avail: Issuing Activity

Summary and topical accounts of the results of studies on a wide range of topics of economic and scientific interest are contained. In addition, many more detailed maps and reports are included in the lists of references cited for each article and in the appended compilations of 277 reports on Alaska published by the U.S. Geological Survey and of 103 reports by U.S. Geologica Survey authors in various other scientific publications. For individual titles, see N85-13284 through N85-13307.

N85-13284# Geological Survey, Alexandria, Va.
SUMMARY OF LANDSAT QUADRANGLE STUDIES IN ALASKA c46
James R. LeCompte, William Clinton Steele, and Nairn R. D. Albert *In its* The United States Geol. Survey in Alaska 1984 p 1-4 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

LANDSAT-image interpretation and (or) LANDSAT feature maps for 27 Alaskan 1:250,000-scale quadrangles were completed. Synthesis of the data compiled indicates that the major features commonly observable on the LANDSAT images of Alaska are lineaments, circular and arcuate features, and anomalously colored areas. B.G.

N85-13285# Geological Survey, Alexandria, Va.
DIGITAL ELEVATION MODELS IMPROVE PROCESSING OF ALASKAN GRAVITY DATA c46
David F. Barnes *In its* The United States Geol. Survey in Alaska 1984 p 5-6 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

The recent availability of an almost complete file of digital elevation models (DEM's) for Alaska makes possible new maps and calculations, including the terrain and isostatic correction of the gravity data used to prepare the previous gravity map of Alaska. This refinement of data, once suitable only for small-scale regional maps of mountainous areas, now makes the same useful for larger scale maps and for such quantitative interpretative procedures as digital modeling. The DEM's consist of metric elevations on a nearly square (commonly 3 by 6 second) geographic grid derived from 1:250,000-scal topographic maps and available on magnetic tapes. New computer techniques to read these tapes now permit terrain corrections on the gravity data accumulated over the past 20 to 30 years, and future programs will provide isostatic, mean-elevation, and other maps. B.G.

N85-13286# Geological Survey, Alexandria, Va.
SEISMIC STUDIES IN SOUTHERN ALASKA c46
Christopher D. Stephens, John C. Lahr, and Robert A. Page *In its* The United States Geol. Survey in Alaska 1984 p 7-9 ref (For primary document see N85-13283 04-42)
Avail: Issuing Activity

Analysis of seismic data from the network in southern Alaska has focused on shallow seismicity in three areas: the Yakataga seismic gap along the northeastern Gulf of Alaska, the southern Kenai Peninsula, and the active volcanoes west of Cook Inlet. A summary of the results for each of these areas is presented. Author

N85-13287# Geological Survey, Alexandria, Va.
HORIZONTAL-STRAIN OBSERVATIONS IN THE SHUMAGIN ISLAND AND YAKATAGA SEISMIC GAPS, ALASKA c46
Michael Lisowski, James C. Savage, and William H. Prescott *In its* The United States Geol. Survey in Alaska 1984 p 9-10 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

The crustal-strain project established a trilateration network near Cape Yakataga in 1979 and in the Shumagin Islands in 1980. Both nets were remeasured after 1 year, and both networks had some observations in common with earlier triangulation or traverse surveys. Comparison of these observations over both the short and long periods allowed placement of some constraints on the rates of strain accumulation in these two seismic gaps. For Shumagin Island, the only significant strain rate observed at the two-standard-deviation level was for the period 1954 to 1980, during which a change in gamma (1) (which measures left-lateral shear parallel to the northeast-striking plate boundary) at a rate -0.25 + or - 0.10 mu strain/yr indicates a right-lateral component of slip on the thrust. Comparison of 1959 and 1979 to 1980 surveys shows that the west edge of the Yakataga network was displaced 3.4 m S. 40 deg E. with respect to the east edge. This deformation is attributed primarily to the 1964 Alaska earthquake, the effects of which apparently penetrated into what is now known as the Yakataga seismic gap. A.R.H.

N85-13288# Geological Survey, Alexandria, Va.
COMPUTER-GENERATED LATITUDE AND LONGITUDE TEMPLATES FOR RAPID DETERMINATION OF GEOGRAPHIC POSITIONS IN ALASKA **c43**
David F. Barnes and Donald Plouff *In its* The United States Geol. Survey in Alaska 1984 p 10-11 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

For the past 8 years, U.S. Geological Survey scientists working in Alaska have been aided by latitude and longitude templates prepared by digital computers. The templates are reproduced on transparent film, which can be easily laid over maps and plotting sheets are now available to the public through specified offices in Anchorage and Denver. The development of templates for determining geographic coordinates is described as well as the various scales and formats available. A.R.H.

N85-13289# Geological Survey, Alexandria, Va.
THE KANAYUT CONGLOMERATE IN THE WESTERNMOST BROOKS RANGE, ALASKA **c43**
Tor H. Nilsen and Thomas E. Moore *In its* The United States Geol. Survey in Alaska 1984 p 12-16 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

The Upper Devonian and Lower Mississippian(?) Kanayut Conglomerate is an allochthonous coarse grained clastic unit that forms a distinctive and mappable stratigraphic unit in the central and eastern Brooks Range. It is as thick as 3,000 m and has been divided, in ascending order, into the Ear Peak Member, Shainin Lake Member, and Stuver Member. The Ear Peak and Stuver members typically contain multiple fining- and thinning-upward cycles that appear to be characteristic of deposition by meandering streams, whereas the Shainin Lake Member typically contains more massive outcrops of conglomerate and sandstone that appear to be characteristic of deposition by braided streams. Conglomerate of the Kanayut is composed of chert, quartzite, and quartz clasts, and the sandstone is typically orthoquartzitic in composition. The Kanayut records outbuilding of a major dominantly fluvial deltato the south and west. It has generally been considered to pinch out laterally to the south and west into age-equivalent units.Its presence in Paleozoic stratigraphic sequences in the Husky Mountains and the Mulgrave Hills at the westernmost maring of the Brooks Range is documented. A.R.H.

N85-13290# Geological Survey, Alexandria, Va.
GEOTHERMAL STUDIES IN ALASKA: CONDITIONS AT PRUDHOE BAY **c43**
Arthur H. Lachenbruch, John H. Sass, B. Vaughn Marshall, Thomas H. Moses, Jr., Robert J. Munroe, and Eugene P. Smith *In its* The United States Geol. Survey in Alaska 1984 p 19-20 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

The thermal regime in the Prudhoe Bay area on the coast of the Beaufort Sea was studied on the basis of temperature measurements through permafrost in the Prudhoe Bay oilfield. Analysis of these data, and of thermal conductivity measurements on samples of drill cuttings and frozen core indicate: (1) the heat flow from the Earth's interior is 1.3 + or - 0.2 heat-flow units (HFU) (55 + or - mW/sq sq m), a value typical of stable continental regions; (2) the permafrost on land near Prudhoe Bay extends to a depth of 630+ m, 50 to 100 percent deeper than permafrost in the Barrow area. This greater depth is caused by the high thermal conductivity of the coarse ice-rich siliceous sediment in the Prudhoe Bay area, (3) in the Prudhoe Bay area the nnual increase averages about 1.8 C (from -10.9 C to -9.1 of temperature C) and is associated with a net accumulation of 5 to 6 kcal/sq cm by the Earth's surface during this period, and (4) rising sea level and thawing seacliffs probably caused the shoreline to advance tens of kilometers in the past 20,000 years, so that a part of the Continental Shelf that is presently the target of intensive oil exploration was inundated. A simple heat-conduction model suggests that the warm seabed will cause the base of ice-rich permafrost to rise about 10 m (from 60 + or - m) during the first 2,000 years after inundation, and thereafter it will rise about 15 m per 1,000 years. A.R.H.

N85-13291# Geological Survey, Alexandria, Va.
RECONNAISSANCE GEOLOGY OF THE NORTHERN PART OF THE UNALAKLEET QUADRANGLE **c46**
William W. Patton, Jr. and Elizabeth J. Moll *In its* The United States Geol. Survey in Alaska 1984 p 24-27 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

The sedimentary and volcanic rocks of the Unalakleet quadrangle in west-central Alaska are discussed. The geological age of various rock sections is addressed. The results of potassium-argon are determinations for hornblende are presented. R.S.F.

N85-13292# Geological Survey, Alexandria, Va.
NEWLY RECOGNIZED SEDIMENTARY ENVIRONMENTS IN THE SHELIKOF FORMATION, ALASKA **c46**
William H. Allaway, Jr. and John W. Miller *In its* The United States Geol. Survey in Alaska 1984 p 34-37 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

Fieldwork shows that the Shelikof Formation in southwestern Alaska consists of both nonmarine and marine facies. The overall trend in the outcrop area is from a deeper water facies near the base of the formation to a shallow-water or nonmarine facies at the top. At Paule Bay, the Shelikof Formation was deposited in a deeper water environment than at Wide Bay. This difference indicates that the paleo-shoreline trended more northerly than the present axis of the Alaska Peninsula. R.S.F.

N85-13293# Geological Survey, Alexandria, Va.
NEW AGES OF RADIOLARIAN CHERT FROM THE RAMPART DISTRICT, EAST-CENTRAL ALASKA **c43**
David L. Jones, Norman J. Silberling, Robert M. Chapman, and Peter Coney *In its* The United States Geol. Survey in Alaska 1984 p 39-43 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

Sedimentary rocks of the Rampart Group in east-central Alaska are dominantly deep water chert, argillite, andesitic volcaniclastic rocks, and very minor tuffaceous bioclastic limestone. Dated rocks range in age from Late Mississippian to Permian, and float blocks suggest the presence of Upper Triassic strata. Radiolarian chert, structurally associated with graywaike and argillite of the Mesozoic flysch belt south of Rampart, is Triassic; its presence may indicate that clastic sedimentation within this belt commenced much earlier than hitherto suspected. R.S.F.

N85-13294# Geological Survey, Alexandria, Va.
CONCORDANT BANDS OF AUGEN GNEISS WITHIN METASEDIMENTARY ROCKS IN THE BIG DELTA C-2 QUADRANGLE, EAST-CENTRAL ALASKA **c46**
Cynthia Dusel-Bacon and Charles R. Bacon *In its* The United States Geol. Survey in Alaska 1984 p 48-50 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

Augen gneiss is a fairly common rock type in the amphibolite-facies metamorphic rocks of the Yukon-Tanana Upland and crops out both as large bodies and, locally, as concordant bands within similarly metamorphosed and cataclasized metasedimentary and (or) metavolcanic rocks. A small area in the Big Delta C-2 quadrangle approximately 25 km north of the margin of the large orthoaugen gneiss body, was visited to examine concordant layers of augen gneiss within the metasedimentary rocks. Petrographic examination of the fine-grained augen gneiss in question, as well as study of the metamorphic textures of the cataclasized rocks in the upland in general, indicates that cataclasis and neocrystallization were closely linked. R.S.F.

N85-13295# Geological Survey, Alexandria, Va.
METAMORPHIC PETROLOGY OF THE TABLE MOUNTAIN AREA, CIRCLE QUADRANGLE, ALASKA **c46**
Anna C. Burack, Jo Laird, Helen L. Foster, and Grant W. Cushing

In its The United States Geol. Survey in Alaska 1984 p 54-57 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

Metamorphic rocks along the Pinnell Mountain tail, are part of a complexly deformed terrane of schist and quartzite of Paleozoic and (or) Precambrian age that are typical of much of the western Yukon Tanana Upland. The petrology of these rocks were studied as a representative sample of this metamorphic terrane. Typical mineral assemblages and presents probable conditions of metamorphism are described for identification of the kind and extent of mineralization in the Table Mountain area. The metamorphic rocks were divided into pelitic schist and quartzite, mafic schist, and calcsilicate rocks. A northeast trending lineament appears to separate rocks regionally metamorphosed to epidote/amphibolite facies on the south from contact metamorphosed rocks on the north. The contact metamorphism, which is related to a small granodiorite pluton has overprinted regional metamorphism of probable epidote-amphibolite facies. Several small epizonal felsic intrusions also crop out north of the lineament, mostly in the vicinity of Table Mountain. E.A.K.

N85-13296# Geological Survey, Alexandria, Va.
PALEOZOIC LIMESTONES OF THE CRAZY MOUNTAINS AND VICINITY, CIRCLE QUADRANGLE, EAST-CENTRAL ALASKA **c46**
Helen L. Foster, Florence R. Weber, and J. Thomas Dutro, Jr. *In its* The United States Geol. Survey in Alaska 1984 p 60-62 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

The many prominent limestone outcrops are the enigmas to be solved in the Crazy Mountains. Steep sided light colored limestone outcrops are visible across the landscape of both the eastern and western Crazy Mountains or many kilometers. In the western Crazy Mountains, similar appearing limestone occurs in several outcrops, possibly isolated by faulting or erosion. Most of the large outcrops in the eastern Crazy Mountains weather gray and are of medium-light gray to medium gray limestone with yellowish brown mottling. A minor amount of dark gray limestone occurs locally, and a few dark gray smooth surfaced dolomite beds are interlayered. The limestone is fine grained with incipient recrystallization; it is generally massive but may be thin bedded locally. Commonly, small white calcite veins and veinlets lace the outcrop. The limestone generally has a spongy appearing solution-pitted surface; rillenstein and other small solution features occur. The geological chronology and morphology are examined. E.A.K.

N85-13297# Geological Survey, Alexandria, Va.
LATE PALEOZOIC AND EARLY MESOZOIC RADIOLARIANS IN THE CIRCLE QUADRANGLE, EAST-CENTRAL ALASKA **c43**
Helen L. Foster, Grant W. Cushing, Florence R. Weber, David L. Jones, Benita Murchey, and Charles D. Blome *In its* The United States Geol. Survey in Alaska 1984 p 62-64 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

Late Palezoic and early Mesozoic radiolarians were found in slightly metamorphosed chert north of the Tintina fault system in the Circle quadrangle was identified. Most of the samples which contain identified radiolarians, in the northern part of the eastern Crazy and Little Crazy Mountains, indicate that these rocks include chert of two distinct ages: late Mississippian or early Pennsylvanian, and middle and late Triassic. The age of the Circle Volcanics is considered to be late Paleozoic and Triassic. E.A.K.

N85-13298# Geological Survey, Alexandria, Va.
STRUCTURAL OBSERVATIONS IN THE CIRCLE QUADRANGLE, YUKON-TANANA UPLAND, ALASKA **c46**
Grant W. Cushing and Helen L. Foster *In its* The United States Geol. Survey in Alaska 1984 p 64-65 ref (For primary document see N85-13283 04-42)
Avail: Issuing Activity

Folds and associated planar structures observed in the metamorphic rocks of the Circle quandrangle south of the Tintina fault during reconnaissance geologic mapping were analyzed to determine the deformational history of the metamorphic terrane of the Yukon-Tanana Upland. Minor folds, ranging in wavelength and amplitude from a few centimeters to several meters, are believed to be related to large scale regional structures throughout most of the quadrangle. The metamorphic terrane consists of interlayered quartzite, quartzitic schist, pelitic schist and gneiss, marble, amphibolite, and greenschist. These rocks range in metamorphic grade from middle greenschist to upper amphibolite facies. The protoliths were dominantly sedimentary rocks and probably Precambrian and Paleozoic. E.A.K.

N85-13299# Geological Survey, Alexandria, Va.
LACUSTRINE AND EOLIAN DEPOSITS OF WISCONSIN AGE AT RIVERSIDE BLUFF IN THE UPPER TANANA RIVER VALLEY, ALASKA **c46**
L. David Carter and John P. Galloway *In its* The United States Geol. Survey in Alaska 1984 p 66-68 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

Riverside Bluff, a 40 m high cut bank on the northeast side of the Tanana River near Riverside Lodge, about 50 km southeast of Tok, is one of the few readily accessible localities in this area at which Quaternary deposits are both thick and well exposed. Two radiocarbon dates for the eolian part of the section and as evidence that some of the bluff deposits are lacustrine in origin, are presented and the possible significance of these lacustrine beds to the late Quaternary history of the upper Tanana Valley is discussed. E.A.K.

N85-13300# Geological Survey, Alexandria, Va.
GLACIAL-LAKE DEPOSITS IN THE MOUNT HARPER AREA, YUKON-TANANA UPLAND **c46**
Florence R. Weber and Thomas A. Ager *In its* The United States Geol. Survey in Alaska 1984 p 68-70 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

During the past year, two new C14 ages and pollen data threw light on some events in the Pleistocene history of the Yukon-Tanana Upland. Woody debris within a volcanic ash layer previously described (Weber, 1982) was dated, as well as some organic material from farther down in the same section. The locality with the new ages is an actively thawing 15-m-high cutbank in unconsolidated sediment on the Middle Fork of the Fortymile River about 16 km southeast of Mount Harper. Mount Harper, with an elevation of 1,994 m, is the highest point in the Yukon-Tanana Upland and has repeatedly supported active glacial systems. A detailed description of the sediments is given. R.J.F.

N85-13301# Geological Survey, Alexandria, Va.
STRATIGRAPHY, PETROLOGY, AND STRUCTURE OF THE PINGSTON TERRANE, MOUNT HAYES C-5 AND C-6 QUADRANGLES, EASTERN ALASKA RANGE, ALASKA **c46**
Warren J. Nokleberg, Carl E. Schwab, Ronny T. Miyaoka, and Carol L. Buhrmaster *In its* The United States Geol. Survey in Alaska 1984 p 70-73 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

Recent field, petrologic, and structural studies of the Pingston terrane in the Mount Hayes C-5 and C-6 quadrangles reveal that in this area the terrane: (1) has a highly distinctive stratigraphy, age, petrology (relict textures, relict minerals, and metamorphic facies), and structure; and (2) differs markedly from that described in previous studies. These more recent studies indicate that the major rock types, in order of decreasing abundance, are meta-andesite, metadacite and metarhyodacite flows and (or) tuff, metabasalt, metagabbro, metavolcanic graywacke, metagraywacke, metasiltstone, metaquartzite or metachert, and very sparse marble. The general petrography of the major rock units in the Pingston terrane is given. R.J.F.

N85-13302# Geological Survey, Alexandria, Va.
PALEOMAGNETIC LATITUDE OF PALEOCENE VOLCANIC ROCKS OF THE CANTWELL FORMATION, CENTRAL ALASKA

c43

John W. Hillhouse and Sherman Gromme *In its* The United States Geol. Survey in Alaska 1984 p 80-82 refs (For primary document see N85-13283 04-42)

Avail: Issuing Activity

The Cantwell basin in the central Alaska Range consists of the Cantwell Formation, which includes, in its upper part, calc-alkaline volcanic rocks and intrusive rocks. The present distributions of the volcanic and sedimentary rocks of the Cantwell Formation is shown. Potassium-argon ages determined from the extrusive and intrusive rocks, which range from 41.8 to 60.6 m.y., are considered to be minimum ages at least in part. These ages accord with the Paleocene age of plant fossils in the Cantwell Formation. The entire Cantwell Formation was extensively folded and faulted, and local angular unconformities occur between the volcanic and sedimentary rocks. It was concluded that the natural magnetization in 18 lava flows studied is thermoremanent magnetization acquired during initial cooling. All lavas exhibited reversed polarity, as is appropriate for their age because Paleocene time was dominated by periods of reversed geomagnetic polarity. R.J.F.

N85-13303# Geological Survey, Alexandria, Va.

PALEOGENE VOLCANIC ROCKS OF THE MATANUSKA VALLEY AREA AND THE DISPLACEMENT HISTORY OF THE CASTLE MOUNTAIN FAULT c46

Miles L. Silberman and Arthur Grantz *In its* The United States Geol. Survey in Alaska 1984 p 82-86 refs (For primary document see N85-13283 04-42)

Avail: Issuing Activity

Primitive strontium-isotopic composition and overall bimodal distribution of silica in upper Paleocene and Eocene subalkalic tholeiitic to calc-alkaline basalt and low-potassium rhyolite of the Matanuska Valley and southern Talkeetna Mountains suggest that these rocks were derived from the mantle with little contamination by continental crust. The volcanic rocks consist of rhyolite tuff and ash flows, as well as basalt flows and dikes, in the nonmarine Arkose Ridge Formation of the southwestern Talkeetna Mountains; of subaerial basalt and andesite flows, tuff, and mafic intrusions in the southeastern Talkeetna Mountains; and of felsic and mafic dikes, sills, and small plutons in the Matanuska Valley. The generalized geology of the area in which the volcanic rocks occur and the localities sampled for potassium-argon-age determinations and for chemical and strontium-isotopic analysis are shown. The analytical results are listed. R.J.F.

N85-13304# California Inst. of Tech., Pasadena. Div. of Geological and Planetary Sciences.

PROGRESS IN LEAD/URANIUM ZIRCON STUDIES OF LOWER PALEOZOIC ROCKS OF THE SOUTHERN ALEXANDER TERRANE c43

Jason B. Saleeby, George E. Gehrels, G. Donald Eberlein (Geological Survey, Alexandria, Va.), and Henry C. Berg (Geological Survey, Alexandria, Va.) *In* Geological Survey The United States Geol. Survey in Alaska 1984 p 110-113 refs (For primary document see N85-13283 04-42)

Avail: Issuing Activity

Geologic mapping and zircon lead/uranium geochronologic studies on southern Prince of Wales Island and southern Annette Island delineated a regional metaigneous complex that ties these two areas together during Ordovician and, possibly, earlier time. Metamorphic-mineral assemblages and fabrics indicate metamorphism to greenchist to amphibolite facies under both static and dynamic conditions. R.J.F.

N85-13305# Geological Survey, Alexandria, Va.

THE NORTHERN COAST PLUTONIC-METAMORPHIC COMPLEX, SOUTHEASTERN ALASKA AND NORTHWESTERN BRITISH COLUMBIA c46

David A. Brew and Arthur B. Ford *In its* The United States Geol. Survey in Alaska 1984 p 120-124 refs (For primary document see N85-13283 04-42)

Avail: Issuing Activity

The northern Coast plutonic-metamorphic complex is but one segment of an 8,000-km-long batholithic complex that extends the length of the North American Cordillera from Baja, California to the Aleutian Islands. Different segments of the Cordilleran batholithic complex have significantly different features. This report documents the main characteristics and inferred evolutionary history of the northern Coast plutonic-metamorphic complex that should facilitate comparisons between segments. B.W.

N85-13306# Geological Survey, Alexandria, Va.

CRETACEOUS PLUTONIC ROCKS, MITKOF AND KUPREANOF ISLANDS, PETERSBURG QUADRANGLE, SOUTHEASTERN ALASKA c46

Peter D. Burrell *In its* The United States Geol. Survey in Alaska 1984 p 124-126 ref (For primary document see N85-13283 04-42)

Avail: Issuing Activity

Reconnaissance geologic mapping and preliminary petrologic studies of a group of similar granitic bodies in a northwest-trending belt in the eastern part of the Petersburg quadrangle suggest that these bodies can be divided into subgroups which are mineralogically similar but texturally distinct. These rocks are all part of the Admiralty-Revillagigedo plutonic belt, which extends from Ketchikan to Juneau, outboard of the Coast plutonic complex; they intrude metamorphic rocks of the Gravina-Nutzotin belt. Textural differences in these granitic bodies are cited. B.W.

N85-13307# Geological Survey, Alexandria, Va.

LATE OLIGOCENE GABBRO NEAR KETCHIKAN, SOUTHEASTERN ALASKA c46

Richard D. Koch and Raymond L. Elliott *In its* The United States Geol. Survey in Alaska 1984 p 126-128 refs (For primary document see N85-13283 04-42)

Avail: Issuing Activity

A large elongate gabbro complex, here referred to informally as the gabbro of Ketchikan Lakes, is exposed over an irregular area, 7 by 16 km, in the vicinity of Ketchikan Lakes just north and east of the town of Ketchikan. Originally believed to be mainly granodiorite and quartz diorite with a small area of leucogabbro this heterogeneous pluton consists entirely of various gabbroic rocks. Mineral composition which varies considerably across this complex is described. B.W.

N85-13308# Observatorio del Ebro, Roquetas (Spain).

SCIENTIFIC CONTRIBUTIONS IN COMMEMORATION OF EBRO OBSERVATORY'S 75TH ANNIVERSARY [CONTRIBUCIONES CIENTIFICAS PARA CONMEMORAR EL 75 ANIVERSARIO DEL OBSERVATORIO DEL EBRO]

J. O. Cardus, ed. 1983 548 p refs Partly in ENGLISH, SPANISH and FRENCH Original contains color illustrations

(ISBN-84-00-05380-X) Avail: NTIS HC A23/MF A01

Solar activity and solar effects on Earth; geomagnetism methodology and observations, ionospheric, aeronomic and meteorological studies, and seismology were discussed. For individual titles, see N85-13309 through N85-13352.

N85-13309# International Council of Scientific Unions, Paris (France).

THE EBRO OBSERVATORY AND INTERNATIONAL SCIENTIFIC ORGANIZATIONS [L'OBSERVATOIRE DE L'EBRE ET LES ORGANISATIONS SCIENTIFIQUES INTERNATIONALES]

J. Coulomb *In* Observatorio del Ebro Sci. Contrib. in Commemoration of the Ebro Observatory's 75th Anniv. 1983 p 41-46 In FRENCH (For primary document see N85-13308 04-42)

Avail: NTIS HC A23/MF A01

The history of the Ebro (Spain) observatory is discussed. Its association with the International Seismology Association, the International Solar Studies Union, the World Meteorological Organization, the International Astronomical Union, and the International Association of Geomagnetism and Aeronony are outlined. Participation in the Geophysical Year is mentioned. Author (ESA)

N85-13310# National Oceanic and Atmospheric Administration, Boulder, Colo. World Data Center A for Solar Terrestrial

Physics.

USE OF EBRO OBSERVATORY DATA AT WORD DATA CENTER A FOR SOLAR-TERRESTRIAL PHYSICS

J. V. Lincoln *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 47-48 (For primary document see N85-13308 04-42)

Avail: NTIS HC A23/MF A01

The contributions of the Ebro observatory to the World Data Center are described. In addition to the many types of studies of geomagnetic variations, disturbances, tides and lunar effects that benefit from long time series of data, the contributions to solid Earth studies of secular change of the Earth's field are mentioned. Other contributions are ionospheric vertical soundings, and ionospheric absorption measurements. Author (ESA)

N85-13311# International Scientific Radio Union, Brussels (Belgium).

INTERNATIONAL COORDINATION IN SCIENTIFIC RESEARCH c84

C. M. Minnis *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 49-57 (For primary document see N85-13308 04-42)

Avail: NTIS HC A23/MF A01

The evolution of international scientific unions for more than 60 years is discussed pointing out that the increased specialization in scientific research leads to structural and financial problems within the International Council of Scientific Unions. Author (ESA)

N85-13312# Specola Vaticana (Vatican City).

FR. ANGELO SECCHI, A PIONEER IN THE STUDY OF SOLAR-TERRESTRIAL RELATIONSHIPS c92

Juan Casanovas *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 59-62 refs (For primary document see N85-13308 04-42)

Avail: NTIS HC A23/MF A01

The contributions of A. Secchi, director of an observatory in Rome from 1850 to 1878 are discussed. His analysis of the spectra of well over 4000 stars and his first classification of stars based on their spectra opened a new field. His work in geophysical problems, solar activity, solar flares and the identification of solar activity influence on the electric state of the atmosphere is commented on. Author (ESA)

N85-13313# Astronomical Inst., Utrecht (Netherlands).

SPACE OBSERVATIONS OF SOLAR FLARES c92

C. DeJager *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 63-68 refs (For primary document see N85-13308 04-42)

Avail: NTIS HC A23/MF A01

Space observations of flares are shown to help in establishing current theories on solar flares. The hard X-ray imaging spectrometer used in the Solar Maximum Mission is described. Observations with the instrument determine the location, morphology and energy spectra of high energy emissions which helps to solve the problem of flare models and mechanisms. Author (ESA)

N85-13314# Space Research Astronomical Observatory, Utrecht (Netherlands). Space Research Lab.

PARTICLE ACCELERATION IN TWO-RIBBON FLARES c92

Zdenek Svestka *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 69-81 refs (For primary document see N85-13308 04-42)

Avail: NTIS HC A23/MF A01

Particle acceleration during a long reconnection process in two-ribbon flares is discussed. The evolution in the understanding of solar flares is summarized, pointing out the contributions of the Skylab mission and other satellite observation missions. A model of a two-ribbon flare is described. Particle acceleration is associated with magnetic reconnection when new loops are formed. Particles are trapped in the loops and produce the hard X-ray, H alpha and white light emission. According to the model, particle acceleration in two-ribbon flares may last for hours, and in filament disruptions, in particular along the boundaries of growing coronal holes, non negligible particle fluxes in space may be produced. Author (ESA)

N85-13315# European Space Agency. European Space Research and Technology Center, ESTEC, Noordwijk (Netherlands). Dept. de Ciencias Espaciales.

THE EARTH MAGNETOSPHERE: A CHARGED PARTICLE ACCELERATOR [LA MAGNETOSFERA TERRESTRE: UN ACELERADOR DE PARTICULAS CARGADAS] c46

V. Domingo *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 83-103 refs In SPANISH (For primary document see N85-13308 04-42)

Avail: NTIS HC A23/MF A01

The state of knowledge of ion and fast electron populations in the outer magnetosphere is reviewed and the contributions of Heos-2 satellite observations are discussed. A three dimensional electron distribution study was carried out using a proton and electron detector on Heos-2 for energies between 40 KeV and 3,5 MeV. Zones of efficient particle acceleration near the magnetopause are found. The source of these particles is the random acceleration produced by electric fields induced in magnetopause turbulences. Author (ESA)

N85-13316# Deutsche Akademie der Wissenschaften, Berlin (East Germany). Zentralinst. fuer Solar-Terrestrische Physik.

RELATIONS BETWEEN THE PARTICLE PRECIPITATION EVENTS IN MID-LATITUDES, THE RING CURRENT INTENSITY AND THE POLARITY OF THE INTERPLANETARY MAGNETIC FIELD c46

E. A. Lauter *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 105-111 refs (For primary document see N85-13308 04-42)

Avail: NTIS HC A23/MF A01

A post-storm event consisting of a long lasting enhanced particle precipitation into the D-region is investigated. It is found to be dependent on a retarded recovery phase of the adhering geomagnetic ring current disturbance. The ring current itself is modulated by the configurations of the interplanetary magnetic field. The equinox configuration with toward or away from the Sun polarity produces the most favorable conditions for the input, the storage and the precipitation of magnetospheric species. Author (ESA)

N85-13317# San Fernando Marine Observatory, Cadiz (Spain).

PRESENT PRACTICE FOR THE RECORDING OF THE EARTH MAGNETIC FIELD [ALTERNATIVAS ACTUALES PARA EL REGISTRO DEL CAMPO MAGNETICO TERRESTRE] c46

M. Catalan *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 113-124 refs In SPANISH (For primary document see N85-13308 04-42)

Avail: NTIS HC A23/MF A01

The magnetometers used as primary standards in magnetic observatories are described. The principles, evolution, and present state of development of classical atomic and saturated nuclei magnetometers are discussed. It is shown that the optimum choice is a proton magnetometer to measure the absolute value of the total field and two orthogonal saturated nuclei sensors to measure declination and inclination of the field. Author (ESA)

N85-13318# National Center for Atmospheric Research, Boulder, Colo. High Altitude Observatory.

ADVANTAGES AND LIMITATIONS OF SPHERICAL HARMONIC ANALYSES OF GEOMAGNETIC DATA c46

S. Matsushita *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro ervatory's 75th Anniv. 1983 p 125-134 refs (For primary document see N85-13308 04-42)

Avail: NTIS HC A23/MF A01

The separation of external and internal geomagnetic variation fields using spherical harmonic data analysis is discussed. Examples obtained from geomagnetic data from 40 stations are presented. A large number of high order spherical harmonic terms is needed to approximate satisfactorily the latitudinal field distribu-

tion with sharp gradients in the auroral and equatorial regions.
Author (ESA)

N85-13319# Kyoto Univ. (Japan). Inst. of Geophysics.
ANALYSIS OF THE DAILY GEOMAGNETIC VARIATION WITH THE USE OF MAGSAT DATA **c46**
H. Maeda *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 135-145 refs (For primary document see N85-13308 04-42)
(Grant JAPAN-MESC-446040(1979))
Avail: NTIS HC A23/MF A01

A method of analysis to separate the external part of the daily magnetic variation field and to evaluate the daily variations at MAGSAT altitudes is discussed. It is shown that the magnetospheric current has a significant effect on the daily variation field at satellite altitudes. The orbit of near-Earth magnetic satellites should not be confined in any local-time meridians even in solar minimum years, in order to make possible the estimation of the daily variation effect. Author (ESA)

N85-13320# Geological Survey, Denver, Colo.
RESEARCH DIRECTIONS IN RECENT STUDIES OF THE LUNAR GEOMAGNETIC EFFECTS **c46**
W. H. Campbell *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 147-154 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

Research into lunar effects on geomagnetism is reviewed. The controversy about latitude location of the lunar ionospheric current systems is discussed. Annual variations reach a maximum after the winter solstice at low latitudes and shift in time to a maximum in the months just after the summer solstice at middle and high latitudes. The interactions with solar activity effects, the ocean contribution and the magnetospheric relationships are examined. The present models of the source mechanisms do not explain sufficiently observations such as the variability in current foci location. Author (ESA)

N85-13321# Goettingen Univ. (West Germany). Inst. fuer Geophysik.
ON DERIVATION AND SIGNIFICANCE OF GEOMAGNETIC EQUIVALENT AMPLITUDE INDICES **c46**
M. Siebert, J. Meyer, and D. Damaske (Freie Univ.) *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 155-168 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

Linear geomagnetic activity indices designated as equivalent amplitudes are compared. Bartel's daily Ap and Mayand's corresponding Am and An are considered. It is demonstrated that a good correlation exists between Ap and Am. However, for the Ap data, a noticeable divergence appears in the years after 1965. A statistical variance analysis of the semiannual wave shows that the scattering for Ap is considerably smaller than for An and thus is the probable error of the average wave. It is concluded that Ap should be preferred. Author (ESA)

N85-13322# Observatorio del Ebro, Roquetas (Spain).
A DIRECTLY OBTAINED GEOMAGNETIC ACTIVITY MEASURE, J3 **c46**
E. J. Chernosky *In its* Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 169-173 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

Arithmetic differences of averaged geomagnetic field intensities for each of the 3hr intervals of successive days were used to derive an index of geomagnetic activity (J3) directly related to relevant changes in the field. It eliminates the unrelated and subjective reference curve. The general confirmity of the aa and Ap values with the latitude related J3 values is surprising in view of the two distinct methods of derivation. Their differences offer expanded interpretative opportunities. The J3 values from a single subauroral station compare favorably with the 3hr indices ranges Am and Ap currently employed in geophysical studies.
Author (ESA)

N85-13323# Tohoku Univ., Sendai (Japan). Inst. of Geophysics.
RESONANCE MODEL OF Pc3 IN SUBTROPICAL REGIONS **c46**
T. Saito *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 175-180 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

A mechanism to explain the subtropical Pc3 evening maximum in diurnal variations is proposed. A resonance model is presented, in which the resonanced oscillation of the field lines in the subtropical regions is excited by the formation effect that causes the Appleton anomaly and subtropical aurora and is observed as the subtropical Pc3. Author (ESA)

N85-13324# Geological Survey, Denver, Colo.
RESEARCH DIRECTIONS IN RECENT STUDIES OF THE LUNAR GEOMAGNETIC EFFECTS **c46**
W. H. Campbell *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 147-154 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

Research into lunar effects on geomagnetism is reviewed. The controversy about latitude location of the lunar ionospheric current systems is discussed. Annual variations reach a maximum after the winter solstice at low latitudes and shift in time to a maximum in the months just after the summer solstice at middle and high latitudes. The interactions with solar activity effects, the ocean contribution and the magnetospheric relationships are examined. The present models of the source mechanisms do not explain sufficiently observations such as the variability in current foci location. Author (ESA)

N85-13325# Energy, Mines and Resources Canada, Ottawa (Ontario). Earth Physics Branch.
DAILY MAGNETIC VARIATIONS AT EBRO, SPAIN **c46**
J. C. Gupta *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 189-198 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

Hourly geomagnetic data of the International Geophysical Year, C period, from Ebro, are used to study daily lunar and solar variations. The analysis of the solar harmonic coefficients shows a shift of the Sq focus toward the North during the noon hours. The spectra of the H component reveal a few frequencies corresponding to the lunar tidal terms. It is also shown that the 27 day recurrence tendency may include a contribution from the long period lunar tidal terms. Author (ESA)

N85-13326# Istituto Nazionale di Geofisica, Rome (Italy).
ON THE ANNUAL AND SEMIANNUAL VARIATION OF S SUB R AT L'AQUILA **c46**
A. Meloni and F. Molina *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 199-213 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

A definition of magnetic seasons through the seasonal variation of mathematical parameters is attempted. The seasonal variation of Sr(H) at l'Aquila, which is a focus observatory, is not consistant with LLoyd's classification. The analysis is based on amplitudes and phases of 4 harmonics of a Fourier analysis, carried out on the H variation for each day with $Ap<7$ in the time interval Jan 59 to Dec 69. It is found that in the longitude zone of l'Aquila the focus of the current system attains the highest altitude in Spring and in October, whereas the lowest altitude is reached in the second half of August. For the D variation it is found that a semiannual wave is present in the yearly variation of harmonic amplitudes, which is significant chiefly for the 8 and 6 hr harmonics. Author (ESA)

N85-13327# Indian Inst. of Geomagnetism, Bombay.
ON SOME NEW FEATURES OF SEMIANNUAL VARIATION OF THE GEOMAGNETIC FIELD **c46**
B. N. Bhargava and D. R. K. Rao *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 215-224 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

Computations from magnetic data restricted to daylight hours were analyzed to estimate the semiannual component of the field with an improved signal to noise ratio. It is shown that this component is entirely equinoctial and that no axial mechanism is observed. Singularities are confined to periods of peak solar activity. The nature of the semiannual component also suggests an association with the preponderance of activity in the northern solar hemisphere over the southern hemisphere. Author (ESA)

N85-13328# Institut Royal Meteorologique de Belgique, Brussels.
LOCAL GEOMAGNETIC CHARACTERISTICS OF SOLAR ACTIVITY (DOURBES 1960-1978) **c46**
F. DeMeyer and A. DeVuyst *In* Observatprio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 225-238 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

Maximum entropy spectral analysis is used to study cyclic and seasonal changes in the Fourier amplitudes of the daily geomagnetic variation and its main harmonics at a single station. The annual means of these coefficients are significantly correlated with the solar cycle; the ratios of the amplitudes of the semi-diurnal and ter-diurnal lines to the magnitude of the diurnal line is independent of solar activity. The spectra show peaks at periods of 27 days, 1 yr, 6 months, and 11 yr. No evidence is found for a lunar synodic line; there are no significant contributions near 54 days, 37 days, 2 yr, and 6 yr. Conclusions on the mechanisms of the annual and semi-annual variations are reconsidered. The Fourier amplitudes of the daily variation give complete frequency information about changes in the geomagnetic field, which are related to solar activity. Author (ESA)

N85-13329# Institute of Geological Sciences, Edinburgh (Scotland).
GEOMAGNETIC SECULAR VARIATION: A JERK IN 1970 **c46**
S. R. C. Malin, B. M. Hodder, and D. R. Barraclough *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 239-256 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

A sudden change of the secular geomagnetic variation was observed in 1970. Differences of annual means of declination, horizontal intensity and vertical downward intensity were examined for 184 world wide observatories. It is seen from the spherical harmonic coefficients that the jerk is limited to the low order harmonics. The phenomenon may be interpreted as an impulsive jerk to the eccentric dipole in the direction 90 deg E, 6 deg S, and an increase in the strength of the dipole moment. Author (ESA)

N85-13330# Helsinki Univ. (Finland). Dept. of Geophysics.
COMPARISONS OF SECULAR VARIATION IN TWO-DIPOLE AND SPHERICAL HARMONIC MODELS WITH OBSERVATORY DATA IN EURASIA, 1965-1975 **c46**
H. Nevanlinna and C. Sucksdorff *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 257-270 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

Secular variation in X, Y and Z for 1965, 1970 and 1975 at 72 geomagnetic observatories covering Eurasia and East North America were fitted to a two-dipole model. The mean vector rms error for all the observatories was 7.4nT/y and for 48 European observatories 4.4nT/y. These errors are roughly the same as those in the spherical harmonic models and in a 3rd degree polynomial model for the epochs 1965.0 and 1970.0. For 1975 the extrapolated spherical harmonic secular variation of Y in Europe and Z in Central Asia differ about 20nT/y from the corresponding values of the two-dipole model and observed values. No systematic anomalous areas of secular variation are detected. Author (ESA)

N85-13331# National Inst. of Polar Research, Tokyo (Japan).
GEOMAGNETIC SECULAR VARIATION AT EBRO OBSERVATORY DURING THE PAST 70 YEARS **c46**
T. Nagata *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 271-276 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

The annual mean values of the geomagnetic field components observed at Ebro during 67 years from 1905 to 1972 are examined on the basis of a decrease of the geomagnetic dipole moment, a westward drift of the nondipole geomagnetic field and a northward shift of the geomagnetic dipole. A monotonous increase of X and Y and an early decrease and a recent very small secular change of Z at Ebro are mostly attributable to the westward drift of nondipole magnetic field of 0.3 deg/yr in the drift speed. It seems that increase of F since 1930 at Ebro can be attributed to both the westward drift of the nondipole field and the northward shift of the dipole. Author (ESA)

N85-13332# Cambridge Univ. (England). Dept. of Geodesy and Geophysics.
REVERSALS OF THE EARTH'S MAGNETIC FIELD **c46**
J. A. Jacobs *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 277-298 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

Reversal mechanisms are analyzed reviewing the existing models describing the changes in geomagnetic field intensity during a polarity transition, the excursions of the magnetic field and the changes in the mean frequency of reversals. The evidence of correlation between major tectonic changes and changes in reversal frequency is mentioned. Assuming that reversals are due to instabilities in the magnetohydrodynamic processes in the core, a stochastic model describing reversals as a Poisson renewal process is presented. The observed sequence of reversals in the past 70 million years fits such a distribution, implying that the core does not remember anything the occurred prior to the previous instability. The asymetry in the distributions in normal and reversed polarity intervals suggests a more complicated alternated renewal model. Author (ESA)

N85-13333# Oslo Univ. (Norway).
DAYSIDE CUSP AURORA **c46**
A. Egeland, K. Henriksen (Tromsoe Univ., Norway), P. E. Sandholt (Tromsoe Univ., Norway), C. S. Deehr (Alaska Univ., Fairbanks), and G. G. Sivjee (Alaska Univ., Fairbanks) *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 299-312 refs Original contains color illustrations (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

A multinational auroral project for investigations of the dayside cusp aurora from Svalbard was carried out. The characteristics of the cusp emissions were studied. Transient, rayed arcs and bands were mapped. A dayside current system exists, associated with the position of the cusp aurora. The intensity and movements of this current system are correlated with the nightside electrojet. It is suggested that a discontinuity similar to the Harang discontinuity exists in the dayside cusp around magnetic noon. Author (ESA)

N85-13334# Freiburg Univ. (West Germany).
SOURCES OF INFORMATION CONCERNING THE IONOSPHERE **c46**
K. Rawer *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 313-324 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

The main ionospheric data sources are studied, including wave propagation methods, ionograms obtained with ionosondes, incoherent scatter observations and direct probing by rocket soundings or specialized satellites. The AEROS satellite missions are discussed and the retarding potential analyzer is described. The value of satellite utilization is shown by the electron temperature model obtained from AEROS-A data. Author (ESA)

N85-13335# Science Research Council, Slough (England). Rutherford and Appleton Labs.
ON THE STUDY OF IONOSPHERIC DISTURBANCES **c46**
H. Rishbeth *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 325-326 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

The transmission to lower latitudes of disturbances originating in the magnetosphere is discussed, reviewing the data contributions from a network of midlatitude ionospheric stations. These contributions include data for the World Data Center Cl, ionosonde data from Ebro observatory, total electron content from INTASAT spacecraft, the Scandinavian Twin Auroral Radar Experiment STARE, the SABRE radar system and the European Incoherent Scatter Radar System EISCAT. Author (ESA)

N85-13336# University Coll. of Wales, Aberystwyth. Dept. of Physics.
THE RESPONSE OF MID-LATITUDE TOTAL ELECTRON CONTENT TO SOLAR ACTIVITY **c46**
L. Kersley and J. Green *In* Observatorio Del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 327-333 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

The polarization rotations of VHF transmissions from geostationary satellites were monitored between 1967 and 1974 at Aberystwyth (54 deg N, 4 deg W). The Faraday rotation is proportional to the electron content along the transionospheric path and the span of data covers a maximum and declining phase of a solar cycle, except for gaps totalling 20% of the period. The results show the sensitivity of daytime electron content to solar flux, with a maximum at equinox and with winter data exceeding those in summer. The pattern expected from the known longitudinal gradient in total electrons is confirmed by the data of 2 stations differing by 10 deg latitude. Linear regression analysis shows that the annual response is sensitive to changes in solar flux, though the quantitative results for the Atlantic sector differ from results for Pacific stations. Author (ESA)

N85-13337# Air Force Geophysics Lab., Hanscom AFB, Mass.
IONOSPHERIC SCINTILLATION: A BRIEF REVIEW **c46**
J. P. Mullen, J. Aarons, and E. M. MacKenzie (Emmanuel Coll., Boston) *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 335-350 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

Irregular diffraction of radio signals by the global ionosphere is studied to predict scintillation using easily measured geophysical parameters. Using a network of equatorial stations it was possible to measure and model the average scintillation characteristics and to relate them to geophysical parameters such as solar flux and geomagnetic indices. Typical models for various stations are shown, including the variations of scintillation as predicted and as measured. The scintillation in auroral regions and the phase distortion caused by the ionosphere are also discussed. Author (ESA)

N85-13338# Max-Planck-Inst. fuer Aeronomie, Katlenburg-Lindau (West Germany).
THE WINTER ANOMALY IN IONOSPHERIC ABSORPTION (WITH SPECIAL REFERENCE TO THE RESULTS OBTAINED IN SPAIN) **c46**
W. Dieminger *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 351-357 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

The investigation of the winter anomaly since its discovery in 1937 is reviewed. The role played by three Spanish stations to monitor the temporal development of the ionospheric absorption over long periods is discussed. The present state of knowledge is summarized, stating that radio wave absorption changes are caused by increased electron density in the altitude range between 75 and 95 km. The sources of electron density increase are enhanced concentration of NO, decrease in the neutral gas density above 100 Km, increased density of excited molecular oxygen, and an increase in temperature. Author (ESA)

N85-13339# Comision Nacional de Investigacion del Espacio, Madrid. Grupo Cientifico de Meteorologica.
POSSIBLE ANOMALY PREDICTION SYSTEM FOR THE MIDDLE ATMOSPHERE [POSIBLE SISTEMA DE PREDICTION DE ANOMALIAS EN LA ATMOSFERA MEDIA] **c46**
B. A. DeLaMorena *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 359-374 refs In SPANISH (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

The application of an ionospheric absorption meter to predict winter anomaly periods is discussed. The measuring system is located at El Arenosillo station, 37.1 deg N, 6.7 deg W. It measures the intensity of the electric field of a 2830 KHz continuous wave reflected at least once in the E or F ionospheric layers. The distance between transmitter and receiver is 424 km. The analysis of the recording through three winter anomaly periods is examined. It is shown that the proposed method is simpler and reduces the cost of the programs to study sudden stratospheric heating by a more efficient use of ionospheric sounding rockets. Author (ESA)

N85-13340# National Physical Lab., New Delhi (India).
MIDDLE ATMOSPHERIC IONIZATION. OBSERVATIONS AND CHEMISTRY **c46**
A. P. Mitra *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 375-410 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

Observational data on electron and ion distributions in the D region and the stratosphere are discussed. Ion and electron density profiles in the atmosphere below 100 km are studied, pointing out the sharp changes found at the 85 km level in many parameters including temperature, atomic oxygen concentration, electron density and positive ion clusters. The effects of distrubances in the D region of solar origin or due to local dynamic or thermal changes are examined. The analysis of stratospheric ionization includes stratospheric positive ions, the role of ions on minor neutrals in the stratosphere, ion combination with trace constituents, positive ion clustering and ion-ion sequences. The role of aerosols is also discussed. Author (ESA)

N85-13341# Granada Univ. (Spain). Dept. Fisica Fundamental.
RADIATION TRANSPORT IN THE EARTH ATMOSPHERE [EL TRANSPORTE RADIATIVO EN LA ATMOSFERA TERRESTRE] **c47**
E. Battaner and J. M. Quintana *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 411-417 refs In SPANISH (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

The equations of radiation transport are presented to study the mesopause cooling produced by the CO2 infrared emissions at 4.26 and 15 microns. The similarity with the astrophysics radiation transport equations is pointed out. A general expression for the vertical component of the radiation energy flow is given. Author (ESA)

N85-13342# Institut Royal Meteorologique de Belgique, Brussels.
SOLAR RADIATION IN THE OZONE LAYER [RADIATION SOLAIRE DANS LA COUCHE D'OZONE] **c92**
M. Nicolet *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 419-428 refs In FRENCH (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

Ultraviolet radiation absorption related to atmospheric ozone is discussed. Solar ultraviolet radiation absorbed by molecular oxygen in photodissociation is considered. The Lyman alpha, the Schumann-Runge continuum and the Herzberg continuum are studied and numerical results obtained at 85 km are presented. The ozone absorption is important in the stratosphere mainly above 215 nm wavelength. Author (ESA)

N85-13343# Centre National de la Recherche Scientifique, Verrieres-le-Buisson (France). Service d'Aeronomie.
WAVE PHASE VELOCITY IN A WIND GRADIENT [LA VELOCIDAD DE FASE DE UNA ONDA EN UN GRADIENTE DE VIENTO] c47
H. Teitelbaum *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 429-436 refs In SPANISH (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

The propagation of a gravity wave in a fluid where the horizontal velocity increases with height is investigated. The horizontal velocity appears as a coefficient in the linearized first order equations. The wave phase velocity equals the fluid velocity at a certain critical level where the wave frequency Doppler shift goes down to zero. It is shown that when the wave phase velocity equals the fluid velocity a tangential discontinuity appears and the wave ceases to exist. Author (ESA)

N85-13344# National Inst. of Meteorology, Madrid (Spain). Centro de Estudios Meteorologicas.
DISTRIBUTION OF TOTAL SOLAR RADIATION IN SPAIN [DISTRIBUCION DE LA IRRADIATION SOLAR GLOBAL EN ESPANA] c47
L. Sanchez Muiniosguren and P. dePabloRicote *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 437-446 refs In SPANISH (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

The monthly and annual distributions of solar radiation are presented based on the average values of 37 stations in Spain and 13 stations in Portugal and Spanish islands. The average total energy input per day is computed showing an energy level four times larger in the summer solstice than in the winter solstice. The total energy received in 1 year in the Spanish territory is 2760 EJ, 1000 times larger than the total 1978 primary energy consumption. Author (ESA)

N85-13345# Lisbon Univ. (Portugal). Inst. Geofisica.
THERMODYNAMIC CONDITIONS OF THE EARTH'S ATMOSPHERE WITH POLLUTION PROCESSES c45
A. S. Mendes *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 447-450 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

The theoretical basis of the thermodynamic conditions of the Earth atmosphere is analyzed. It is initially admitted that the mass of the system is indestructible, but the case in which there are chemical reactions in the medium, causing destruction of the atmosphere components is also considered. Pollution by natural products and human activity, by natural and artificial radioactive products, electrified particles, and electromagnetic forces is considered. Equations showing the rate of generation or destruction of the atmospheric components are presented. Author (ESA)

N85-13346# San Calixto Observatory, La Paz (Bolivia).
SEISMOLOGY TODAY [SISMOLOGIA HOY] c46
R. Cabre *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 451-457 refs In SPANISH (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

Progress in seismology is reviewed. An improved accuracy in seism prediction is the most important practical result of seismology. Several means to measure ground elastic deformations and the statistical methods utilized are described. The evolution of seismic physical models is discussed. Work with miniseisms in laboratory is mentioned. Author (ESA)

N85-13347# Javeriana Univ., Bogota (Colombia). Inst. Geofisico de Los Andes Colombianos.
CHARACTERISTICS OF A RECENT COLUMBIAN EARTHQUAKE, DECEMBER 12, 1979 [CARACTERISTICAS DEL RECIENTE TERREMOTO COLOMBIANO DEL 12 DE DICIEMBRE DE 1979] c46
J. E. Ramirez *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 459-488 In SPANISH (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

An earthquake is described. The geographic and tectonic characteristics of the South West region of Columbia are detailed. The characteristics of the earthquake as well as the sea waves that followed, the damage produced and the records obtained by instruments or visual witness are discussed. It is thought that the seism corresponds to the surface flexing of the ocean lithosphere. Author (ESA)

N85-13348# MacQuarie Univ., North Ryde (Australia). School of Earth Sciences.
LOVE AND RAYLEIGH WAVES IN IRREGULAR GROUND c46
L. A. Drake *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 489-504 refs (For primary document see N85-13308 04-42)
(Grant NSF EAR-76-00118)
Avail: NTIS HC A23/MF A01

A finite element model of one side of an alluvial valley was analyzed for incident fundamental mode Love and Rayleigh wave motion at periods from 2 to 0.375 sec. The slowness of Love and Rayleigh waves of the fundamental mode across the irregular region at the edge of the alluvial valley are approximately the means of the slowness of these waves at the side of the valley and within it. The mode shapes at the sides and within the valley are related to the calculated amplification of ground surface motion within the valley. The extent of damping is analyzed. The phase velocities of the fundamental modes are calculated for the irregular region at the edge of the valley for periods of 2 and 1.5 sec. At a period of 1.5 sec the vertical displacement of fundamental mode Rayleigh waves within the valley is out of phase with the vertical displacement at the side of the valley. Author (ESA)

N85-13349# Instituto Geografico Nacional, Madrid (Spain).
A REVIEW OF SEISMICITY IN PENINSULAR SPAIN [REVISION DE LA SISMICIDAD DE LA ESPANA PENINSULA] c46
J. Mezcua and A. Lopez Arroyo *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 505-514 refs In SPANISH (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

The space and time distribution of seismicity defined either by earthquake records or by seismic instrument records are studied. The results are presented as a seismic intensity mapping of Spain and a scheme showing the main tectonic features at the origin of earthquakes. The analysis of the predominant displacements shows a relative independence of the Iberic peninsula referred to the Eurasian block. Author (ESA)

N85-13350# Observatorio Geofisico Central de Toledo (Spain). Observatorio Geofisico Central.
STRUCTURE OF THE CRUST AND UPPER MANTLE OF THE IBERIAN CONTINENTAL PLATFORM [ESTRUCTURA DE LA CORTEZA Y MANTO SUPERIOR DE LA PLATFORMA CONTINENTAL IBERICA] c46
G. Payo, J. Sierra, and E. RuizdelaParte *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 515-526 refs In SPANISH (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

The Iberian crust structure was studied by analyzing the Rayleigh and Love surface waves from natural earthquakes. A network of four stations measured the phase velocity by the correlation of equal period peaks method. A Fourier analysis was carried out on the digitized seismograms. The amplitude and phase spectra were obtained. It is concluded that the Iberic peninsula is a typical continental structure with an average crust depth of 30 to 32 km. The sedimentary layer is 2 to 3 km deep, given a granite shear velocity of 3.3 km/sec. Values of 4.5 and 7.6 km/sec are obtained for the shear and compression velocities in the 20 km deep layer under the Mobo. Author (ESA)

N85-13351# Institut de Physique du Globe, Paris (France).
DEEP STRUCTURE BENEATH THE PYRENEES c46
A. Souriau *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Aniiv. 1983 p 527-536 refs In FRENCH; ENGLISH summary (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

The structure of the crust and upper mantle beneath the Pyrenees is studied. The dispersion of Rayleigh waves is analyzed along a transpyrenean profile between Carcassone and Tortose and two northern profiles. The seismic wave models calculated from this data show a general structure similar to that obtained for the Aquitaine basin and for the stable hercynian regions of France. Lower phase velocities in the upper mantle are found in the North Pyrenean zone. Two crustal models are proposed for the western parts of this zone. The transverse profile does not reveal low velocities in the South-western part of Catalonia. This result indicates that the late tertiary-quaternary extension in Catalonia did not affect this region. Author (ESA)

N85-13352# Universidad Complutense, Madrid (Spain). Catedra de Geofisica.
DEEP STRUCTURE AND SEISMICITY IN THE CATALONIA-PYRENEES REGION [ESTRUCTURA PROFUNDA Y SISMICIDAD DE LA REGION CATALUNA-PIRINEOS] c46
A. Roca, E. Surinach, A. Udias, and E. Banda *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 537-547 refs In SPANISH (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

The deep structure of the Earth crust and the main tectonic characteristics of the Catalonia-Pyrenees region were analyzed by the observation of the seismic profiles and the study of the seismicity. The waves generated by controlled explosions were recorded by portatle seismographs. In the western Pyrenees the propagation velocity of the P waves in the crystalline basement is 6 km/sec, and its depth is 4 km. The axial zone shows a variable crust depth, from 22 km on the coast to > 50 km below the Aneto region. The tectonic interpretation of seismic data indicates that the triangle formed by the Pyrenees, the Iberic mountains and the coast may be considered as a sub-plate of the main peninsula. Estimations of earthquake return periods are also given. Author (ESA)

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography.*

N85-13353 Deutsche Geodaetische Kommission, Munich (West Germany).
[DETERMINATION OF THE LONGITUDE DIFFERENCES MUNICH-LISSABON-SAN FERNANDO, MUNICH-WETTZELL, AND MUNICH-KARLSRUHE-NIEDERREIFERBERG]
1983 50 p refs In GERMAN; ENGLISH summary
(Astron-Geodaet-Arb-44; ISBN-3-7696-9787-1; ISSN-0340-7691)
Copyright. Avail: Issuing Activity

The longitude differences between the reference stations Munich, Lissabon and San Fernando, and between the reference stations Munich and Wettzell are determined with an accuracy of about + or 0(s).0011. The longitude differences between the reference stations Munich, Karlsruhe and Niederreifenberg are determined with an accuracy of the order + or - 0(s).0030. For individual titles, see N85-13354 through N85-13355.

N85-13354 Deutsche Geodaetische Kommission, Munich (West Germany).
DETERMINATION OF ASTRONOMICAL LONGITUDE DIFFERENCES FOR THE EUROPEAN LONGITUDE REFERENCE SYSTEM FOR 1980. RELATIVE RIGHT ASCENSION CORRECTIONS FOR 125 FK4 AND FK4 SUP STARS [BESTIMMUNG ASTRONOMISCHER LAENGENDIFFERENZEN FUER DAS EUROPAEISCHE LAENGENNETZ IM JAHR 1980. RELATIVE REKTASZENSIONSVERBESSERUNGEN FUER 125 STERNE DES FK4 UND FK4 SUP]
Klaus Kaniuth and Werner Wende *In its* Determination of the Longitude Differences Munich-Lissabon-San Fernando, Munich-Wettzell, and Munich-Karlsruhe-Niederreiferberg 1983 p 5-35 refs In GERMAN; ENGLISH summary (For primary document see N85-13353 04-43)
Copyright. Avail: Issuing Activity

Longitude differences between Munich-Lissabon-San Fernando and Munich-Wettzell were determined. In connection with the establishment of a modern astronomical longitude reference system in Europe, longitude differences between national reference stations of the Federal Republic of Germany, Portugal and Spain are measured with a Danjon-Astrolabe. The adjustment of the observations in two modes is described. The data reduction is explained. The internal accuracy of the longitude differences is about 0(s).0011. The relative right ascension correction of FK4-and FK4 Sup-stars derived from the observations are discussed together with those already obtained from measurements between 1977 and 1979. Author (ESA)

N85-13355 Deutsche Geodaetische Kommission, Munich (West Germany).
DETERMINATION OF ASTRONOMICAL LONGITUDE DIFFERENCES: MUNICH, KARLSRUHE, NIEDERREIFENBERG IN 1974 [BESTIMMUNG DER ASTRONOMISCHEN LAENGENDIFFERENZEN: MUENCHEN, KARLSRUHE, NIEDERREIFENBERG]
Werner Wende *In its* Determination of the Longitude Differences Munich-Lissabon-San Fernando, Munich-Wettzell, and Munich-Karlsruhe-Niederreiferberg 1983 p 37-49 refs In GERMAN; ENGLISH summary Sponsored by IFAG (For primary document see N85-13353 04-43)
Copyright. Avail: Issuing Activity

The longitude differences between the three reference stations Munich, Karlsruhe and Niederreifenberg were determined. The aims were to establish a longitude reference point at the University of Karlsruhe, and to provide a further determination of the longitude difference between the already existing reference stations Niederreifenberg and Munchen. The astronomical longitude differences between the three stations are obtained using two transit instruments Askania AP70. The data reduction procedure is described. The internal accuracies of the longitude differences are of the order of + or - 0(s).0030. Author (ESA)

N85-13356*# SAR, Inc., Riverdale, Md.
LANDSAT INSTRUMENTS CHARACTERIZATION
Y. Lee, Principal Investigator Aug. 1984 19 p ERTS
(Contract NAS5-28200)
(E85-10032; NASA-CR-174123; NAS 1.26:174123) Avail: NTIS HC A02/MF A01 CSCL 05B

Several studies were performed using LANDSAT-4 and -5 simultaneous overpath data 40608-15472 and 50014-15465 over Pensacola, FL. The overlap region of these two scenes was determined visually on the IAT and then sampled into 32 x 32 segments. The mean and standard deviation (SD) for each segment were calculated. In general, the plots of the means of LANDSAT-4 versus LANDSAT-5 lie on the diagonal line. Some of the data lie out of the diagonal line, which indicates a possible bidirectional observation effect occurs. In addition to editing the five FCL files on CALDUMP tapes into seven 1000 minor frame (MF). CAL files, program LEE.FOR was modified to use information from start of shutter obscuration extracted from program START.FOR to create seven 200 MF.CAL files that can be run through the current TRAPP program for TM sensor characterization. The location of start of shutter obscuration was determined for both LANDSAT-4 and -5. A.R.H.

N85-13357*# Arizona Univ., Tucson.

INVESTIGATION OF SEVERAL ASPECTS OF LANDSAT 4/5 DATA QUALITY Quarterly Progress Report

Robert C. Wrigley, Principal Investigator 20 Sep. 1984 10 p ERTS

(Contract NCC2-234)

(E85-10036; NASA-CR-174129; NAS 1.26:174129) Avail: NTIS HC A02/MF A01 CSCL 05B

A technique under development uses a zoom transfer scope to register the photograph of the target with digitally enlarged photographic hardcopy of the TM data using a visual fit to the area surrounding the target. The first attempt using the Sacramento Scene (44/33) of February 1, 1983 indicated that relief displacement in the aerial photography would cause large errors. A second attempt is in progress using the aero-triangulated scene centers which have no relief displacement. Being calculated points, the scene centers have somewhat larger absolute errors in geolocation, approximately 3 meters instead of 1.5 meters. The average TM effective instantaneous field of view (EIFOV) calculated from modulation transfer functions (MTFs) is 52.7 m. This is smaller than the 55 and 65 m EIFOVs reported earlier using noisy MTFs but larger than the EIFOVs from the San Mateo Bridge analysis which ranged from 44.5 to 50.9 m and averaged 47.6 m for the same TM scene. R.S.F.

N85-13358*# Hawaii Univ., Honolulu. Planetary Geosciences Div.

ICE-SOIL MIXTURES: VISUAL AND NEAR-INFRARED REMOTE SENSING TECHNIQUES Final Report

Roger N. Clark 22 Feb. 1984 21 p refs Presented at the 4th Inter. Conf. on Permafrost

(Grant NAGw-115)

(NASA-CR-174087; NAS 1.26:174087; PGD-Pub-369) Avail: NTIS HC A02/MF A01 CSCL 08L

The spectral properties of ice soil mixtures are reviewed. Water ice has an absorption coefficient which varies by several orders of magnitude in the visual and near infrared, and has several prominent overtone absorptions. Different wavelengths can be used to probe to different depths in the surface as well as for different mineral impurity concentrations. Empirical and/or theoretical models might be used to derive characteristics grain size of the ice or of the impurity minerals and to derive abundance of the ice and rock or soil components. Quantitative analysis of remotely obtained reflectance spectra can only be performed by using absorption features in the spectra of ice and soil, and not by broadband response. It is suggested that this might be done by special selection of several narrow band filters in the near infrared which will adequately define the ice absorptions. E.A.K.

N85-13359# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).

REPORT OF THE FIELD WORK PERFORMED IN THE BASINS OF THE QUEBRA OSSO AND TANQUE PETRO RIVERS IN THE CATAS ALTAS QUADRANGLE, MINAS GERAIS [RELATORIO DO TRABALHO DE CAMPO REALIZADO NAS BACIAS DOS RIOS QUEBRA OSSO E TANQUE PRETO, NA QUADRICULA DE CATAS ALTAS, MINAS GERAIS]

Athos Ribeiro dosSantos, Marx Prestes Barbosa, and Paulo Veneziani Sep. 1984 58 p refs In PORTUGUESE; ENGLISH summary

(INPE-3268-NTE/225) Avail: NTIS HC A04/MF A01

The specific objective of this geological mapping in the region of Santa Barbara (MG) in the scale of 1:8,000, was to get acquainted with the lito-structural and tectonic evolution of the Quebra Osso and Nova Lima rocks part of the Greenstone Belt and its old basement. Author

N85-13360# Earthtech Research Corp., Baltimore, Md.

THERMAL PROPERTIES OF SOILS AND SOILS TESTING Final Report

Muriel Jennings Wallter and Thomas P. Bligh (Massachusetts Inst. of Tech., Cambridge) Dec. 1983 160 p refs

(Contract DE-AC03-80SF-11509)

(DE84-015312; DOE/SF-11509/T2) Avail: NTIS HC A08/MF A01

Thermal conductivity of dry moist soils and the difficulty of measuring thermal properties are discussed. The MIT thermal conductivity probe is presented along with a description of the design issues, validation experiments, error, manufacturing and experimental procedures for using the probes in the laboratory and field (for continuous data gathering or for single or multiple measurements). A new method for producing the complete thermal conductivity versus moisture content curve, which eliminates most of the usual difficulties, is outlined. A new theory which can explain the complex variation of thermal conductivity of soil at different moisture contents for both frozen and unfrozen soils is presented. Empirical models, correlating soil thermal properties with standard soils analysis, for use by the field practitioner are offered along with an explanation of Time Domain Reflectometry techniques for measurement of in-situ soil moisture content. The report concludes with recommendation for future work. DOE

N85-13361*# Kansas Univ. Center for Research, Inc., Lawrence.

SCATTERING MODELS IN THE MICROWAVE REGIME Final Report

Adrian K. Fung Oct. 1984 57 p refs

(Grant NAG5-268)

(NASA-CR-174001; NAS 1.26:174001) Avail: NTIS HC A04/MF A01 CSCL 05B

Results of first and second year research efforts are summarized in a series of complete articles and abstracts. The goal of the first year efforts was to calculate scattering from an inhomogeneous layer with irregular boundaries to model natural terrains. The model was applied to interpret measurements from vegetation, snow, and sea ice. The goal of the second year was to extend the scattering model to handle disc shaped scatterers which are comparable to incident wavelength and to use the model to investigate the relative merits between active versus passive sensing of soil moisture over vegetated terrain. For individual titles, see N85-13362 through N85-13364.

N85-13362*# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.

SCATTERING FROM RANDOMLY ORIENTED SCATTERERS OF ARBITRARY SHAPE IN THE LOW-FREQUENCY LIMIT WITH APPLICATION TO VEGETATION Final Report

M. A. Karam and A. K. Fung *In its* Scattering Models in the Microwave Regime Oct. 1984 8 p refs (For primary document see N85-13361 04-43)

Copyright. Avail: NTIS HC A04/MF A01 CSCL 05B

A general theory of intensity scattering from small particles of arbitrary shape was developed based on the radiative transfer theory. Upon permitting the particles to orient in accordance with any prescribed distribution, scattering models can be derived. By making an appropriate choice of the particle size, the scattering model may be used to estimate scattering from media such as snow, vegetation and sea ice. For the purpose of illustration only comparisons with measurements from a vegetated medium are shown. The difference in scattering between elliptic and circular shaped leaves is demonstrated. In the low frequency limit, the major factors on backscattering from vegetation are found to be the depth of the vegetation layer and the orientation distribution of the leaves. The shape of the leaf is of secondary importance. M.G.

N85-13363*# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.

SCATTERING FROM RANDOMLY ORIENTED CIRCULAR DISCS WITH APPLICATION TO VEGETATION Final Report

M. A. Karam and A. K. Fung *In its* Scattering Models in the

Microwave Regime Oct. 1984 10 p refs Repr. from Radio Sci. (US), v. 18, no. 4, Jul. - Aug. 1983 p 557-565 Previously announced as A83-40654 (For primary document see N85-13361 04-43)
Avail: NTIS HC A04/MF A01 CSCL 05B

A vegetation layer is modeled by a collection of randomly oriented circular discs over a half space. The backscattering coefficient from such a half space is computed using the radiative transfer theory. It is shown that significantly different results are obtained from this theory as compared with some earlier investigations using the same modeling approach but with restricted disc orientations. In particular, the backscattered cross polarized returns cannot have a fast increasing angular trend which is inconsistent with measurements. By setting the appropriate angle of orientation to zero the theory reduces to previously published results. Comparisons are shown with measurements taken from milo, corn and wheat and good agreements are obtained for both polarized and cross polarized returns. Author (IAA)

N85-13364*# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.
A COMPARISON BETWEEN ACTIVE AND PASSIVE SENSING OF SOIL MOISTURE FROM VEGETATED TERRAINS Final Report
A. K. Fung and H. J. Eom *In its* Scattering Models in the Microwave Regime Oct. 1984 35 p refs (For primary document see N85-13361 04-43)
Avail: NTIS HC A04/MF A01 CSCL 05B

A comparison between active and passive sensing of soil moisture over vegetated areas is studied via scattering models. In active sensing three contributing terms to radar backscattering can be identified: (1) the ground surface scatter term; (2) the volume scatter term representing scattering from the vegetation layer; and (3) the surface volume scatter term accounting for scattering from both surface and volume. In emission three sources of contribution can also be identified: (1) surface emission; (2) upward volume emission from the vegetation layer; and (3) downward volume emission scattered upward by the ground surface. As ground moisture increases, terms (1) and (3) increase due to increase in permittivity in the active case. However, in passive sensing, term (1) decreases but term (3) increases for the same reason. This self conpensating effect produces a loss in sensitivity to change in ground moisture. Furthermore, emission from vegetation may be larger than that from the ground. Hence, the presence of vegetation layer causes a much greater loss of sensitivity to passive than active sensing of soil moisture. M.G.

N85-13365*# Johns Hopkins Univ., Baltimore, Md. Dept. of Earth and Planetary Sciences.
LITHOSPHERIC STRUCTURE IN THE PACIFIC GEOID Semiannual Report
Bruce D. Marsh 14 Dec. 1984 5 p
(Grant NAG5-32)
(NASA-CR-174155; NAS 1.26:174155) Avail: NTIS HC A02/MF A01 CSCL 08E

In order that sub-lithospheric density variations be revealed with the geoid, the regional geoid anomalies associated with bathymetric variations must first be removed. Spectral techniques were used to generate a synthetic geoid by filtering the residual bathymetry assuming an Airy-type isostatic compensation model. An unbiased estimated of the admittances show that for region under study, no single compensation mechanism will explain all of the power in the geoid. Nevertheless, because topographic features are mainly coherent with the geoid, to first order an isostationally compensated lithosphere cut by major E-W fracture zones accounts for most of the power in the high degree and other SEASAT geoid in the Pacific. B.G.

N85-13366# Economic Research Service, Washington, D. C.
ASSESSING EROSION ON US CROPLAND: LAND MANAGEMENT AND PHYSICAL FEATURES
N. L. Bills and R. E. Heimlich Jun. 1984 26 p refs
(PB84-219252; AER-513) Avail: NTIS HC A03/MF A01 CSCL 08M

The taxonomy of soil erosion presented here delineates land resources with high potential for erosion control. More than one-third of U.S. cropland is inherently nonerosive under all management regimes, about half requires conservation management to keep soil loss within tolerable limits, and the remaining 8 percent is so erosive that acceptable soil loss rates cannot be achieved under intensive cultivation. GRA

N85-13367# North Dakota Univ., Grand Forks. Dept. of Geology.
GEOTHERMAL RESOURCE ASSESSMENT FOR NORTH DAKOTA Final Report
William D. Gosnold, Jr. Apr. 1984 116 p refs
(Contract DE-FC07-79ID-12030)
(DE84-016128; DOE/ID-12030/T4; Rept-Bull-84-04-MMRRI-04)
Avail: NTIS HC A06/MF A01

Temperatures in four geothermal aquifers, Inyan Kara (Cretaceous), Mission Canyon (Mississippian), Duperow (Devonian), and Red River (Ordovician) are in the range for low and moderate temperature geothermal resources within an area of about 130,000 sq km in North Dakota.The accessible resource base is 13,500 10 to the 18th power J., which, assuming a recovery factor of 0.001, may represent a greater quantity of recoverable energy than is present in the basin in the form of petroleum. A synthesis of heat flow, thermal conductivity, and stratigraphic data was found to be significantly more accurate in determining formation temperatures than the use of linear temperature gradients derived from bottom hole temperature data. The thermal structure of the Williston Basin is determined by the thermal conductivities of four principal lithologies: Tertiary silts and sands (1.6 W/m/K), Mesozoic shales (1.2 W/m/K), Paleozoic limestones (3.2 W/m/K), and Paleozoic dolomites (3.5 W/m/K). The stratigraphic placement of these lithologies leads to a complex, multicomponent geothermal gradient which precludes use of any single component gradient for accurate determination of subsurface temperatures. DOE

N85-13368# Utah Geological and Mineralogical Survey, Salt Lake City. Energy Section.
GEOTHERMAL ASSESSMENT OF THE LOWER BEAR RIVER DRAINAGE AND NORTHERN EAST SHORE GROUND-WATER AREAS, BOX ELDER COUNTY, UTAH
Robert H. Klauk and Karin E. Budding Jul. 1984 98 p refs
(Contract DE-AS07-77ET-28393)
(DE84-017358; DOE/ET-28393/T4; Rept-186) Avail: NTIS HC A05/MF A01

The Utah Geological and Mineral Survey (UGMS) was researching the low temperature geothermal resource potential in Utah. The study conducted in the lower Bear River drainage and northern East Shore ground water areas in Box Elder County, Utah is discussed. The primary purpose of the study is to identify new areas of geothermal resource potential. There are seven known low temperature geothermal areas in this part of Box Elder County. Geothermal reconnaissance techniques used in the study include a temperature survey, chemical analysis of well and spring waters, and temperature depth measurements in accessible wells. The geothermal reconnaissance techniques identified three areas which need further evaluation of their low temperature geothermal resource potential. Area 1 is located in the area surrounding Little Mountain, area 2 is west and southwest of Plymouth, and area 3 is west and south of the Cutler Dam. DOE

N85-13288# Geological Survey, Alexandria, Va.
COMPUTER-GENERATED LATITUDE AND LONGITUDE TEMPLATES FOR RAPID DETERMINATION OF GEOGRAPHIC POSITIONS IN ALASKA
David F. Barnes and Donald Plouff *In its* The United States Geol. Survey in Alaska 1984 p 10-11 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

N85-13289# Geological Survey, Alexandria, Va.
THE KANAYUT CONGLOMERATE IN THE WESTERNMOST BROOKS RANGE, ALASKA

Tor H. Nilsen and Thomas E. Moore *In its* The United States Geol. Survey in Alaska 1984 p 12-16 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

N85-13290# Geological Survey, Alexandria, Va.
GEOTHERMAL STUDIES IN ALASKA: CONDITIONS AT PRUDHOE BAY
Arthur H. Lachenbruch, John H. Sass, B. Vaughn Marshall, Thomas H. Moses, Jr., Robert J. Munroe, and Eugene P. Smith *In its* The United States Geol. Survey in Alaska 1984 p 19-20 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

N85-13293# Geological Survey, Alexandria, Va.
NEW AGES OF RADIOLARIAN CHERT FROM THE RAMPART DISTRICT, EAST-CENTRAL ALASKA
David L. Jones, Norman J. Silberling, Robert M. Chapman, and Peter Coney *In its* The United States Geol. Survey in Alaska 1984 p 39-43 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

N85-13297# Geological Survey, Alexandria, Va.
LATE PALEOZOIC AND EARLY MESOZOIC RADIOLARIANS IN THE CIRCLE QUADRANGLE, EAST-CENTRAL ALASKA
Helen L. Foster, Grant W. Cushing, Florence R. Weber, David L. Jones, Benita Murchey, and Charles D. Blome *In its* The United States Geol. Survey in Alaska 1984 p 62-64 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

N85-13302# Geological Survey, Alexandria, Va.
PALEOMAGNETIC LATITUDE OF PALEOCENE VOLCANIC ROCKS OF THE CANTWELL FORMATION, CENTRAL ALASKA
John W. Hillhouse and Sherman Gromme *In its* The United States Geol. Survey in Alaska 1984 p 80-82 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

N85-13304# California Inst. of Tech., Pasadena. Div. of Geological and Planetary Sciences.
PROGRESS IN LEAD/URANIUM ZIRCON STUDIES OF LOWER PALEOZOIC ROCKS OF THE SOUTHERN ALEXANDER TERRANE
Jason B. Saleeby, George E. Gehrels, G. Donald Eberlein (Geological Survey, Alexandria, Va.), and Henry C. Berg (Geological Survey, Alexandria, Va.) *In* Geological Survey The United States Geol. Survey in Alaska 1984 p 110-113 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

N85-13459# Joint Publications Research Service, Arlington, Va.
SOME PRINCIPLES OF PLANT RESOURCES EVALUATION USING REMOTELY SENSED DATA
S. M. Gorozhankina and V. D. Konstantinov *In its* USSR Rept.: Life Sci.: Biomed. and Behavioral Sci. (JPRS-UBB-84-026) 5 Dec. 1984 p 3-18 refs Transl. into ENGLISH from Rastitelnyye Resursy (Leningrad), v. 20, no. 3, 1984 p 297-307 (For primary document see N85-13457 04-51)
Avail: NTIS HC A08

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N85-13369# Vawtpower, Inc., Albuquerque, N. Mex.
DEVELOPMENT AND DEMONSTRATION OF A VERTICAL AXIS WIND TURBINE POWERHOUSE Final Report
Paul N. Vosburgh Jun. 1984 100 p Sponsored by New Mexico Energy Research and Development Inst.
(DE84-901449; NMERDI-2-71-4622) Avail: NTIS HC A05/MF A01

A performance of reliable lower cost base assembly and controls was designed for the electricity generating wind energy conversion system of the VAWTPOWER 185 wind turbine. The base assembly includes low speed shaft and couplings, disc or drum brake, hydraulic or pneumatic brake control systems, speed increasing gear box, high speed shaft and couplings, induction motor/generator, bottom rotor bearings, lightning and ground fault protection, support structure, and environmental protection. VAWTPOWER 185 is a 200 kW capacity Vertical Axis Wind Turbine rated 185 kW at 37 mph. After system analysis, subsystem definition, detailed design and engineering, and development of a test plan, two versions of the powerhouse were fabricated and tested. Both appear ready for commercial production. DOE

N85-13370# University of Eastern New Mexico, Portales. Dept. of Physical Sciences: Physics.
SOLAR ENERGY RESOURCE ASSESSMENT IN EASTERN NEW MEXICO AND SOLAR AND WIND ENERGY RESOURCE ASSESSMENT IN EASTERN NEW MEXICO Final Report, 1 Jul. 1978 - 31 Dec. 1983
O. Dayle Sittler and Mercedes M. Agogino Jun. 1984 29 p refs Sponsored by the New Mexico Energy Research and Development Inst.
(DE84-901511; NMERDI-2-67-2430; NMERDI-2-68-2421) Avail: NTIS HC A03/MF A01

Solar insolation data collected by the pyranometer station established at Eastern New Mexico University with funds from a previous New Mexico Energy Research and Development Institute grant were recorded and analyzed. Operation of the station, methods of data analysis, and the development of a microprocessor recording system to automate data analysis of solar and wind energy data are described. Daily and monthly solar radiation averages from the old instrumentation are presented for the period October, 1978 through December, 1979 and those from the new instrumentation from January, 1982 through December, 1983. DOE

N85-13371*# United Technologies Corp., South Windsor, Conn. Power Systems Div.
REGENERATIVE FUEL CELL ENERGY STORAGE SYSTEM FOR A LOW EARTH ORBIT SPACE STATION
R. E. Martin, J. Garow, and K. B. Michaels Aug. 1984 146 p refs
(Contract NAS3-22234)
(NASA-CR-174802; NAS 1.26:174802; FCR-6128) Avail: NTIS HC A07/MF A01 CSCL 10B

Results of a study to define the characteristics of a regenerative fuel cell energy storage system for a large space station operating in low earth orbit (LEO) are presented. The regenerative fuel cell system employs an alkaline electrolyte fuel cell with the option of employing either an alkaline or a solid polymer electrolyte electrolyzer. R.S.F.

N85-13372*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
INTERNATIONAL TEST AND DEMONSTRATION OF A 1-MW WELLHEAD GENERATOR: HELICAL SCREW EXPANDER POWER PLANT Final Report
Richard A. McKay 1 Jun. 1984 234 p refs
(Contracts NAS7-918; DE-AI03-79ET-37116)
(NASA-CR-174161; JPL-Pub-84-29; NAS 1.26:174161; DOE/ET-37116/2) Avail: NTIS HC A11/MF A01 CSCL 10B

A 1-MW wellhead generator was tested in 1980, 1981, and 1982 by Mexico, Italy, and New Zealand at Cerro Prieto, Cesano, and Broadlands, respectively. The total flow helical screw expander portable power plant, Model 76-1, had been built for the U.S. Government and field-tested in Utah, USA, in 1978 and 1979. The expander had oversized internal clearances designed for self-cleaning operation on fluids that deposit adherent scale normally detrimental to the utiliation of liquid dominated fields. Conditions with which the expander was tested included inlet pressures of 64 to 220 psia, inlet qualities of 0% to 100%, exhaust pressures of 3.1 to 40 psia, electrial loads of idle and 110 to 933 kW, electrical frequencies of 50 and 60 Hz, male rotor speeds of 2500 to 4000 rpm, and fluid characteristics to 310,000 ppm total dissolved solids and noncondensables to 38 wt % of the vapor. Some testing was done on-grid. Typical expander isentropic efficiency was 40% to 50% with the clearances not closed, and 5 percentage points or more higher with the clearances partly closed. The expander efficiency increased approximately logarithmically with shaft power for most operations, while inlet quality, speed, and pressure ratio across the machine had only small effects. These findings are all in agreement with the Utah test results. DOE

N85-13373*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
FSA FIELD TEST Annual Report, Aug. 1981 - Jan. 1984
Robert W. Weaver, Robert H. Lee, John D. Meyer, and L. Daniel Runkle 15 Aug. 1984 36 p refs
(Contract NAS7-918; JPL Proj. 5101-254; Contract DE-AI01-76ET-20356)
(NASA-CR-174114; DOE/JPL-1012-100; NAS 1.26:174114) Avail: NTIS HC A03/MF A01 CSCL 10A

A modified plan for the flat plate solar array (FSA) project was implemented. Accomplishments included completion of six arrays containing Block 4 modules, the portable array data logger and a representative sample of Block 1, 2, and 3 modules and were redeployed for continued endurance testing. The portions of the plan which were modified include: (1) a reduction in the number of Block 4 modules deployed; (2) a reduced data acquisition schedule; (3) abandonment of the Table Mountain and Point Vicente sites; and (4) a sample of the modules from the 12 continental remote sites underwent the final test procedures. Current endurance data are presented for the remaining Block 1, 2, and 3 modules. It is indicated that more of these modules have failed or decreased in power output during this period. None of the Block 4 modules under test during this period have failed, but 11 of the 155 deployed modules show reduced power output. E.A.K.

N85-13374*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
EXPERIMENTAL AND THEORETICAL STUDY OF A SOLAR THERMOCHEMICAL RECEIVER MODULE
Yong S. Won, G. E. Voecks, and J. H. McCrary (New Mexico State Univ.) 15 Jul. 1984 34 p refs
(Contracts NAS7-918; DE-AM04-80AL-13137)
(NASA-CR-174107; DOE/JPL-1060-76; JPL-Pub-84-53; JPL-5105-239; NAS 1.26:174107) Avail: NTIS HC A03/MF A01 CSCL 10A

A few years ago, a prototype test module of a solar thermochemical receiver using an SO2/SO3 reaction system was designed, built, and tested to establish a technical data base for future subsystem design efforts. Emphasis was placed on experimental verification of the computer simulation to establish a reliable design tool to predict the thermochemical performance of the receiver with a reasonable degree of confidence. The computational results were compared with experimental results obtained from the module tested at New Mexico State University. Reasonable agreement was found over a range of test conditions. It was concluded that the present design offers satisfactory conversion performance and operational flexibility for the construction of a complete reactor/receiver unit for use in a 10- to 15-kW dish collector system. Author

N85-13375*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CONCENTRATOR OPTICAL CHARACTERIZATION USING COMPUTER MATHEMATICAL MODELLING AND POINT SOURCE TESTING
E. W. Dennison, S. L. John, and G. F. Trentelman 15 Sep. 1984 41 p refs
(Contracts NAS7-918; DE-AM04-80AL-13137)
(NASA-CR-174109; DOE/JPL-1060-77; JPL-Pub-84-75; JPL-5105-140; NAS 1.26:174109) Avail: NTIS HC A03/MF A01 CSCL 10A

The optical characteristics of a paraboloidal solar concentrator are analyzed using the intercept factor curve (a format for image data) to describe the results of a mathematical model and to represent reduced data from experimental testing. This procedure makes it possible not only to test an assembled concentrator, but also to evaluate single optical panels or to conduct non-solar tests of an assembled concentrator. The use of three-dimensional ray tracing computer programs to calculate the mathematical model is described. These ray tracing programs can include any type of optical configuration from simple paraboloids to array of spherical facets and can be adapted to microcomputers or larger computers, which can graphically display real-time comparison of calculated and measured data. B.W.

N85-13376*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SOFTWARE USED WITH THE FLUX MAPPER AT THE SOLAR PARABOLIC DISH TEST SITE
C. Miyazono 15 Sep. 1984 63 p
(Contracts NAS7-918; DE-AM04-80AL-13137)
(NASA-CR-174108; DOE/JPL-1060-78; JPL-Pub-84-76; JPL-5105-141; NAS 1.26:174108) Avail: NTIS HC A04/MF A01 CSCL 10A

Software for data archiving and data display was developed for use on a Digital Equipment Corporation (DEC) PDP-11/34A minicomputer for use with the JPL-designed flux mapper. The flux mapper is a two-dimensional, high radiant energy scanning device designed to measure radiant flux energies expected at the focal point of solar parabolic dish concentrators. Interfacing to the DEC equipment was accomplished by standard RS-232C serial lines. The design of the software was dicated by design constraints of the flux-mapper controller. Early attemps at data acquisition from the flux-mapper controller were not without difficulty. Time and personnel limitations result in an alternative method of data recording at the test site with subsequent analysis accomplished at a data evaluation location at some later time. Software for plotting was also written to better visualize the flux patterns. Recommendations for future alternative development are discussed. A listing of the programs used in the anaysis is included in an appendix. Author

N85-13377# Midwest Research Inst., Golden, Colo.
FIVE YEAR RESEARCH PLAN, 1984-1988. PHOTOVOLTAICS: ELECTRICITY FROM SUNLIGHT Solar Energy Research Inst.
May 1984 18 p
(Contract DE-AC02-83CH-10093)
(DE84-013009; SERI/SP-211-2350) Avail: NTIS HC A02/MF A01

Research and development in amorphous silicon photovoltaics technology that will result in a technology base from which private enterprise can choose options for further development and competitive application in electric energy market is discussed. The project is based on continuing partnerships between government, industry, and the academic community. The two primary research activities are single junction cells and multijunction, stacked solar cells. The five secondary research activities are material deposition rate, alternative material deposition methods, light induced effects, device testing and reliability, and supporting research. The management plan is summarized. DOE

N85-13378# Sandia Labs., Albuquerque, N. Mex.
EVALUATION OF SOME PHOTOVOLTAIC CONCENTRATOR SOLAR CELL-HEAT SINK COUPLING MATERIALS
L. C. Beavis Jul. 1984 40 p
(Contract DE-AC04-76DP-00789)
(DE84-016027; SAND-82-2281) Avail: NTIS HC A03/MF A01

Measurements on materials which are considered for use as bonding agents between concentrator solar cells and the heat sink are reported. The ultrasound technique for detecting voids and delamination and some of the results of measurements using the technique are described. The thermal conductivity of candidate semirigid bonding agents is also summarized. Particle size, material, and bonding agents analyses of some of these materials are described. Results of analyses of three types of high thermal conductivity greases are presented. DOE

N85-13379# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
CuInSe2-BASED PHOTOELECTROCHEMICAL CELLS: THEIR USE IN CHARACTERIZATION OF THIN CuInSe2 FILMS, AND AS PHOTOVOLTAIC CELLS PER SE
D. Cahen, Y. W. Chen, P. J. Ireland, R. Noufi, J. A. Turner, C. Rincon (Univ. de Los Andes, Merida, Venezuela), and K. J. Bachmann (North Carolina State Univ., Raleigh) May 1984 8 p refs Presented at the 17th IEEE PV Specialists Conf., Orlando, Fla., 1-5 May 1984
(Contract DE-AC02-83CH-10093)
(DE84-004514; SERI/TP-212-2329; CONF-840561-16) Avail: NTIS HC A02/MF A01

Photoelectrochemistry has been employed to characterize the p-CuInSe2 component of the CdS/CuInSe2 on-metal and a nonaqueous electrolyte containing a redox couple not specifically adsorbed onto the semiconductor. Electrochemical decomposition of CuInSe2 was investigated in acetonitrile solutions to determine the mechanism of decomposition (n and p) in the dark and under illumination. Electrochemical, solution chemical and surface analyses confirmed at the light-assisted decomposition of CuInSe2 resulted in metal ions and elemental chalcogen. On the basis of the results from the electrochemical decomposition, and studies on the solid state chemistry of the (Cu2Se) sub x (In2Se3) sub 1-x system and surface analyses, the CuInSe2/polyiodide interface was stabilized and up to 11.7% conversion efficiencies were obtained. DOE

N85-13380# Sandia Labs., Albuquerque, N. Mex.
TAILORED AIRFOILS FOR VERTICAL AXIS WIND TURBINES
P. C. Klimas 1984 6 p refs Presented at the Intersoc. Energy Conversion Eng. Conf., San Francisco, 19-24 Aug. 1984
(Contract DE-AC04-76DP-00789)
(DE84-013618; SAND-84-1062C; CONF-840804-27) Avail: NTIS HC A02/MF A01

The evolution of a family of airfoil sections designed to be used as blade elements of a vertical axis wind turbine (VAWT) is described. This evolution consists of extensive computer simulation, wind tunnel testing and field testing. The process reveals that significant reductions in system costs-of-energy and increases in fatigue lifetime may be expected for VAWT systems using these blade elements. DOE

N85-13381# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
SILICON FOR SOLAR CELLS
T. F. Ciszek Apr. 1984 50 p refs
(Contract DE-AC02-83CH-10093)
(DE84-004503; SERI/TR-212-2084) Avail: NTIS HC A03/MF A01

An introduction to silicon solar cell technology and photovoltaic device operation is presented. The conventional semiconductor industry techniques for extraction of Si from quartz, purification of silanes, chemical vapor deposition of polycrystalline silicon rods, melt growth of silicon crystals, and fabrication of silicon polished wafers are reviewed. The specific requirements of silicon for solar cells, particularly impurity effects are discussed. Nineteen different crystal growth methods of silicon for solar cells are reviewed (both ingots and sheets). Sheet growth methods are categorized by solid/liquid interface meniscus geometry and degree of shaper/melt interaction. Crystal growth rates and surface area generation rates are analyzed for sheet growth configurations as well as combined ingot growth and wafering approaches. Several methods show promise of achieving high throughput rates. Some of the characteristics of silicon which have led to its role as both a near term and long range premier photovoltaic material are summarized. DOE

N85-13382# Purdue Univ., Lafayette, Ind. Inst. for Interdisciplinary Engineering Studies.
CORRELATION AND REASSESSMENT OF THE OTEC PLANT POWER CYCLE Final Report
G. T. Heydt, W. Leidenfrost, A. T. McDonald, and L. L. Ogborn Jul. 1984 247 p refs
(Contract DE-AC01-82CE-30718)
(DE84-015467; DOE/CE-30718/T1) Avail: NTIS HC A11/MF A01

The purpose of this effort is to investigate alternative system concepts and component configurations to improve performance of the OTEC power system. Reliability, Availability, and Maintainability (RAM) characteristics were examined along with various methods of converting energy into utility-grade energy. A research program consisting of five tasks was developed: development of engineering guidelines for OTEC systems; thermal and mechanical evaluation of components; evaluation of electrical system requirements; evaluation of operating strategies for OTEC plants; and application of modern technology to OTEC design choices. These studies are discussed in detail along with recommendations and conclusions. DOE

N85-13383# Brookhaven National Lab., Upton, N. Y. Dept. of Applied Science.
THIN POLYMER FILM COLLECTORS AS A CONTRIBUTION TO THE SOLAR INDUSTRY
W. G. Wilhelm Jun. 1984 6 p Presented at the Ann. Meeting of the American Solar Energy Society, Anaheim, Calif., 5 Jun. 1984
(Contract DE-AC02-76CH-00016)
(DE84-015299; BNL-34937; CONF-840622-13) Avail: NTIS HC A02/MF A01

Progress in research on thin polymer film solar flat plate collectors using monocoque construction techniques is discussed. The significance of these achievements for cost reduction of flat plate collectors without compromising performance is outlined. DOE

N85-13384# Brookhaven National Lab., Upton, N. Y.
ADVANCED AMORPHOUS MATERIALS FOR PHOTOVOLTAIC CONVERSION Annual Report, 1983
P. E. Vanier, G. Rajeswaran, F. J. Kampas, and R. R. Corderman Jan. 1984 30 p refs
(Contract DE-AC02-76CH-00016)
(DE84-017198; BNL-51772) Avail: NTIS HC A03/MF A01

Thin films with properties which help to improve the conversion efficiency and with properties which help to improve the conversion efficiency and stability of the devices were developed. The goal is to increase the rate of deposition of high quality semiconducting material. The materials include intrinsic and doped hydrogenated amorphous silicon and related alloys deposited by rf capacitive glow discharge, and transparent conducting layers such as indium oxide and indium tin oxide. The improvement of deposition rate and the optimization of film properties for device applications require a fundamental understanding of the processes occurring in the glow discharge plasma and at the surface of the growing film. Optical emission spectroscopy and mass spectrometry are used to analyze the processes. The prepared films are studied by optical and infrared spectroscopy, electron microscopy, photoconductivity, and photoluminescence. The film properties are correlated with plasma processing parameters. High efficiency photovoltaic devices are fabricated to test the usefulness of the materials for the different layers of a solar cell, and to explore problems which may occur at the interfaces between these layers. Factors affecting the efficiency and stability of such cells are deduced from an analysis of their electrical characteristics and spectral response. DOE

N85-13385*# Rockwell International Science Center, Thousand Oaks, Calif.
STUDY PROGRAM FOR ENCAPSULATION MATERIALS INTERFACE FOR FLAT-PLATE SOLAR ARRAY (FSA) PROJECT Final Report, 23 Mar. 1977 - 31 Jan. 1984
D. H. Kaelble and C. L. Leung Apr. 1984 67 p refs Sponsored in cooperation with DOE Prepared for JPL, Pasadena, Calif.
(Contracts NAS7-100; JPL-954739)
(NASA-CR-174152; DOE/JPL-854739-84/06; NAS 1.26:174152; DE84-017101; SCS106.165FR) Avail: NTIS HC A04/MF A01 CSCL 10A

The early validation of a 20 year service integrity for the bonded interface in solar cell modules is an important requirement in the Low Cost Solar Array (LSA) project. The sixth and final phase of the program, as reported in this document, generates and validates the necessary design and process principles for achieving long-term interfacial bonding stability (IBS) of Flat Solar Array (FSA) photovoltaic encapsulated systems. DOE

N85-13386*# Research Triangle Inst., Research Triangle Park, N.C.
COMPREHENSIVE SILICON SOLAR CELL COMPUTER MODELING Quarterly Progress Report, 5 Apr. - 4 Jul. 1984
M. F. Lamorte Sep. 1984 45 p refs Sponsored in cooperation with DOE Prepared for JPL, Pasadena, Calif.
(Contracts NAS7-100; JPL-956741)
(NASA-CR-174151; DOE/JPL-956741-84/02; NAS 1.26:174151; DE84-017384; RTI-415U-2850; QPR-2) Avail: NTIS HC A03/MF A01 CSCL 10A

A new computer modeling method is described and is applied to silicon solar cells. The method is similar to numerical integration (NI) methods in that both require the use of a mesh point field. The set of transport equations is applied to each mesh point, and, through a judicious selection of the mesh point distribution, an accurate closed-form analytical function is obtained at the assigned mesh point. Application of the boundary conditions, to an f-mesh point field, results in 2f-equations that require simultaneous solution. This solution is manifested through the determination of the 2f-constants of integration, where each closed-form solution, representing a mesh point, contains two constants of integration. Effects of temperature, solar concentration, submodel parameters, and structure parameters may be studied. A model is developed to describe the charge distribution that establishes a built-in field. The model requires that a redistribution of majority carriers takes place from the charge neutrality distribution. DOE

N85-13387# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
THERMAL ENERGY STORAGE AT 900 DEG C
R. J. Copeland, R. E. West, and F. Kreith May 1984 7 p refs Presented at the 19th Ann. Intersoc. Energy Conversion Eng. Conf., San Francisco, 19-24 Aug. 1984
(Contract DE-AC02-83CH-10093)
(DE84-004589; SERI/TP-252-2359; CONF-840804-30) Avail: NTIS HC A02/MF A01

A preliminary technical and economic analysis of various concepts for sensible heat storage at a temperature of 900 C is presented. A raft thermocline system, a two tank system, and a dual media thermocline system are discussed, and design and performance criteria are presented. DOE

N85-13388# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho. National Engineering Lab.
THERMOMAGNETIC GENERATOR
L. D. Kirol and J. I. Mills 1984 9 p refs Presented at the Intersoc. Energy Conversion Eng. Conf., San Francisco, 19-24 Aug. 1984
(Contract DE-AC07-76ID-01570)
(DE84-017018; EGG-M-24183; CONF-840804-44) Avail: NTIS HC A02/MF A01

Thermomagnetic generators which convert heat to electricity directly, without a mechanical interface were examined. Regenerative thermomagnetic generators were analyzed for three materials. Power density and efficiency higher than previously reported in the literature appear achievable. Practical machines may be possible, but further study is required. Some possible configurations are discussed. Areas for future investigation include identification of optimum materials and verification of heat transfer correlations. Capital cost for a thermomagnetic generator is estimated as comparable to the cost for commercially available low temperature organic Rankine cycle generators. DOE

N85-13389# JBF Scientific Corp., Wilmington, Mass.
ANALYSIS OF WIND ENERGY SYSTEMS FOR SELECTED ELECTRIC UTILITIES Final Subcontract Report
T. F. McCabe Jul. 1984 332 p refs Prepared for Midwest Research Inst., Golden, Colo.
(Contract DE-AC02-83CH-10093)
(DE84-013025; SERI/STR-211-2379) Avail: NTIS HC A15/MF A01

The value of wind energy conversion systems (WECS), the amount a utility could afford to pay for wind machines with no reliability penalties was assessed. Nine electric utilities were analyzed and different wind turbine installation years to determine the effects of changes in generation mix and how capacity displacement would alter fuel savings were considered. Wind resource and WECS performance, current and projected utility characteristics, and utility financial parameters relative to carrying investments in production facilities are compared. It is found that WECS savings are dependent on generation mix and increase when fuel costs increase, capacity credit ranges considerably and can enhance the value of WECS, and the value of WECS is dependent in a highly complex manner on financial considerations, amount of wind energyy available, and per unit savings. DOE

N85-13390# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
NATIONAL PHOTOVOLTAICS PROGRAM ANNUAL REVIEW MEETING, ABSTRACTS
1984 170 p Meeting held in Kissimmee, Fla., 30 Apr. 1984
(Contract DE-AC02-83CH-10093)
(DE84-013003; SERI/CP-211-2109; CONF-840441-Summ) Avail: NTIS HC A08/MF A01

Twelve brief presentation summaries are presented covering the following topics: Sunshine Project; European program in photovoltaics; SERI photovoltaics research; Sandia projects; subcontracted research and development; significant issues and results; concentrator research; flat-plate solar array project; and photovoltaic health and safety assessment. B.G.

N85-13391# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
OPEN CYCLE OTEC THERMAL-HYDRAULIC SYSTEMS ANALYSIS AND PARAMETRIC STUDIES
Brian Patsons, Desikan Bharathan, and Jay Althof Jun. 1984 10 p refs Presented at the Oceans '84 Conf., Washington, D.C., 10 Sep. 1984
(Contract DE-AC02-83CH-10093)
(DE84-013011; SERI/TP-252-2330; CONF-840930-2) Avail: NTIS HC A02/MF A01

An analytic thermohydraulic systems model of the power cycle an seawater supply systems for an open cycle ocean thermal energy conversion (OTEC) plant has been developed that allows ready examination of the effects of system and component operating points on plant size and parasitic power requirements. This paper presents the results of three parametric studies on the effects of system temperature distribution, plant gross electric capacity, and the allowable seawater velocity in the supply and discharge pipes. The paper also briefly discusses the assumptions and equations used in the model and the state-of-the-art component limitations. The model provides a useful tool for an OTEC plant designer to evaluate system trade-offs and define component interactions and performance. DOE

N85-13392# Lockheed Missiles and Space Co., Huntsville, Ala. Research and Engineering Center.
POSSIBILITIES OF CONJUGATING BINARY SOLUTIONS FOR THERMAL ENERGY STORAGE
P. G. Crodzka 1984 7 p refs Presented at the Intersoc. Energy Conversion Eng. Conf., San Francisco, 19-24 Aug. 1984
(Contract DE-AC05-84OR-21400)
(DE84-016704; CONF-840804-41) Avail: NTIS HC A02/MF A01

A concept for thermal energy storage (TES) has recently emerged that depends on the heats of mixing of a pair of different liquids as a critical solution temperature. Liquid pairs that mix or unmix at a critical solution temperature (CST) are called conjugating binary (CB) systems. The possibilities of the concept for chill and heat storage for residential and commercial purposes are reviewed and the results of material searches for the different applications reported. An economic analysis of the concept for commercial chill storage shows that the concept compares favorably with ice storage systems. DOE

N85-13393# International Trade Administration, Washington, D.C.
US ENERGY FOR THE REST OF THE CENTURY, 1984 EDITION Annual Report
J. F. Gustaferro 2 Jul. 1984 57 p refs
(PB84-207406) Avail: NTIS HC A04/MF A01 CSCL 10A

The U.S. energy consumption and supply for two years 1983 and 2000 is presented. In 1983 the United States consumed about 70.5 quadrillion British thermal units of energy. A U.S. energy consumption of about 84 quadrillion British thermal units in the year 2000 is projected. The 84 quadrillion British thermal units consists of 13 million barrels per day of petroleum, 18 trillion cubic feet of natural gas and 3.5 trillion kilowatt hours of electricity. Coal production is projected at 1,405 million tons which includes exports. The data presented in the 1984 forecast over the spectrum of U.S. energy requirements and focus on the end use of energy operational purposes, e.g., highway transportation, space heating, lighting, and construction. Data on fuel consumption by types and energy content for 1983 and as projected for the year 2000 is provided. End users of energy in the United States currently spend $441 billion annually for energy. This includes direct taxes. GRA

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N85-13394# Argonne National Lab., Ill. Geoscience and Engineering Group.
OUTLINE OF A NEW EMISSIONS MODEL FOR MILITARY AND CIVILIAN AIRCRAFT FACILITIES
Donald M Rote Jan. 1984 60 p
(Contract W-31-109-eng-38)
(DE84-016455; ANL/EES-TM-253) Avail: NTIS HC A04/MF A01

The proposed computational version of the Airport Vicinity and Air Pollution model and the Air Quality Assessment Model is intended to meet the need for computer models usable by a wider community of users on small, modern minicomputers. A detailed series of computer program flowcharts are presented. These figures show the overall structure of the system as well as the detailed structure of the most important components of the emissions portion of the system. Detailed descriptions of the structures and contents of the major data files used to store input and output data and to transfer data between the independently executable computer codes that make up the entire system are given. An example of a possible interactive data file program designed to simplify the task of compiling and editing the various data files is also presented. DOE

N85-13395# Brookhaven National Lab., Upton, N. Y. Dept. of Applied Science.
AIRCRAFT MEASUREMENTS OF TRACER GAS DURING THE 1983 CROSS APPALACHIAN TRACER EXPERIMENT (CAPTEX)
Gilbert S. Raynor, Russell N. Dietz, and Ted W. DOttavio 1984 6 p refs Presented at the 4th AMS Joint Conf. on Appl. of Air Pollution Meteorol., Portland, Oreg., 15-19 Oct., 1984 Submitted for publication
(Contract DE-AC02-76CH-00016)
(DE84-015292; BNL-35035; CONF-841059-10) Avail: NTIS HC A02/MF A01

The Cross Appalachian Tracer Experiment (CAPTEX) was conducted in September and October 1983 to simulate the long range transport and dispersion of air pollutants from known source regions. The experimental program included tracer releases, a ground level sampling network, extensive aircraft plume sampling flights, trajectory forecasts and augmented meteorological measurements. Briefly described are the program, aircraft sampling component, representative results, and interpretation of them in terms of meteorological conditions during the experimental periods. DOE

N85-13396# Oak Ridge National Lab., Tenn.
MODELING EFFECTS OF TOXICANTS ON AQUATIC SYSTEMS
S. M. Bartell, R. V. ONeill, and R. H. Gardner 1984 5 p refs Presented at the ASCE Hydraulics Div. Spec. Conf., Coeur d'Alene, Idaho, 14 Aug. 1984
(Contract DE-AC05-84OR-21400)
(DE84-016594; CONF-840888-1) Avail: NTIS HC A02/MF A01

Potential effects of chemicals on biomass production in aquatic systems are extrapolated from laboratory toxicological assays. The extrapolation requires that the effect of acute toxicity data be expressed as changes in growth parameters of species in a model (SWACOM). The model simulates seasonal production of biomass in a dimictic lake. Uncertainties concerning mode of chemical action and extrapolation from the laboratory to natural systems are explicitly retained in the calculations. Effects are estimated as probabilities of occurrence of predefined endpoints. DOE

N85-13397# Systems Applications, Inc., San Rafael, Calif.
IMPACT OF ALCOHOL FUELS ON URBAN AIR POLLUTION: METHANOL PHOTOCHEMISTRY STUDY
Gary Z. Whitten, Barrett Pullamn (Santa Clara Univ., Calif.), and Richard K. Pefley (Santa Clara Univ., Calif.) Jun. 1984 3 p refs Presented at the Methanol Symp., El Monte, Calif. 29 Jun. 1984
(Contract DE-FG03-84CE-50036)
(DE84-012950; CONF-8406166-1) Avail: NTIS HC A02/MF A01

The past decade of research has clearly established methanol as one of the leading candidates from an environmental standpoint to replace petroleum in the ground transportation sector. Early studies, although limited, have indicated that in like operational circumstances methanol generated emissions can be as low as or lower than hydrocarbon emissions in photochemical reactivity. During the study, the smog chamber facilities at the University of Santa Clara have been used to conduct further validation studies of methanol's photochemistry. The facility consists of a 100 cubic foot aluminum and Pyrex chamber with an enclosed FEP Teflon bag. Eighty-four blacklights and eighteen sunlamps provided the solar simulation. The study primarily focused on neat methanol's exhaust and evaporative emissions photochemistry. Methanol/gasoline blends were considered in an introductory way. Three series of photochemistry experiments were performed. The first series consisted entirely of hydrocarbon surrogates and methanol exhaust surrogates. The second series involved hydrocarbon surrogates and actual methanol vehicle exhaust. The third series compared exhaust and evaporative emissions from a base gasoline and a methanol/gasoline blend. DOE

N85-13398# Idaho National Engineering Lab., Idaho Falls.
INTEGRATED GLOBAL BACKGROUND MONITORING NETWORK
G. Bruce Wiersma Aug. 1984 32 p refs Presented at Symp. on Res. and Monitoring in Circumpolar Biosphere Reserves, Waterton Lakes, Alberta, 27-31 Aug. 1984
(Contract DE-AC07-76ID-01570)
(DE84-016996; EGG-M-16784; CONF-840898-1) Avail: NTIS HC A03/MF A01

The background is described and the need for an integrated global background monitoring network is elucidated. This network should: establish reference levels for pollutants that have potential for global contamination, serve as an early warning site for detecting global spread of pollutants, and establish baseline levels for selected ecosystem parameters against which data from more impacted areas can be compared. This paper proposes the following: (1) establish an integrated global background monitoring network for pollutants and ecosystem parameters; (2) pollutant measurements be multi-media; (3) carry out ecosystem parameter studies in conjunction with pollutant measurements; (4) the network be maintained for an indefinite period of time; (5) the network be established using the international biosphere reserve system as the universe from which a subset of monitoring sites are drawn; and (6) that the project be under the overall direction of the Global Environmental Monitoring System. DOE

N85-13399# Brookhaven National Lab., Upton, N. Y. Biomedical and Environmental Assessment Div.
HEALTH AND ENVIRONMENTAL EFFECTS DOCUMENT FOR PHOTOVOLTAIC ENERGY SYSTEMS, 1983
P. D. Moskowitz, E. A. Coveney, M. A. Crowther, L. D. Hamilton, S. C. Morris, K. M. Novak, P. E. Perry, S. Rabinowitz, M. D. Rowe, and W. A. Sevian Sep. 1983 106 p refs
(Contract DE-AC02-76CH-00016)
(DE84-017179; BNL-51676) Avail: NTIS HC A06/MF A01

Health risks arising from the fabrication, installation, operation, and decommissioning of photovoltaic energy systems have been studied. Occupational risks from accidental injuries were quantified, and illness-related effects were examined. Although significant illness-related effects are not expected, potential chemical (e.g., phosphine) and physical (e.g., radio-frequency radiation) hazards found in the workplace merit careful consideration. Public health risks from pollutants (e.g., cadmium) emitted thoughout the energy cycle and from physical hazards (i.e., electrical shock and fire) associated with rooftop decentralized applications were reviewed. The risks from pollutants seem to be larger than the physical hazards considered, but they are highly uncertain. Risks to exposed individuals from electric shock and fire may be significant, but societal risks are probably small. Reseach needed to reduce uncertainties in these risk assessments includes examination of new materials and fabrication processes, measurements of public and occupational exposures to hazardous chemical and physical environments, and identification of mechanisms and probabilities of fire and electric shock due to photovoltaics applications. DOE

N85-13400# Environmental Sciences Research Lab., Research Triangle Park, N.C. Meteorology and Assessment Div.
REGIONAL-SCALE (1000 KM) MODEL OF PHOTOCHEMICAL AIR POLLUTION. PART 2: INPUT PROCESSOR NETWORK DESIGN
R. G. Lamb Aug. 1984 312 p refs
(PB84-232651; EPA-600/3-84-085-Pt-2) Avail: NTIS HC A14/MF A01 CSCL 13B

Detailed specifications are given for a network of data processors and submodels that can generate the parameter fields required by the regional oxidant model. Operations performed by the processor network include simulation of the motion and depth of the nighttime radiation inversion layer; simulation of the depth of the convective mixed and cloud layers; estimation of the synoptic-scale vertical motion fields; generation of ensembles of layer-averaged horizontal winds; calculation of vertical turbulence fluxes, pollutant deposition velocities, parameters for a subgrid-scale concentration fluctuation parameterization scheme; and many other functions. This network of processors and submodels, in combination with the core model, represent the EPA's first-generation regional oxidant model. GRA

N85-13401# Texas Univ., Austin. Coll. of Engineering.
URBAN AEROSOL MODELING
J. R. Brock Aug. 1984 42 p refs
(Grant EPA-R-808601)
(PB84-233469; EPA-600/3-84-088) Avail: NTIS HC A03/MF A01 CSCL 13B

Accurate numerical schemes were developed for simulation of the condensation/evaporation processes with vapor conservation for a single component aerosol. These were incorporated in modules which allow simulation of aerosol dynamics in models for dispersion and transport. The coagulation process can be simulated by these methods with high accuracy. In coagulation simulation errors can be reduced to any desired level by choices of width and size interval. It is shown that the method of fractional steps give excellent results with large savings in computer time. The condensation/evaporation process with vapor conservation was simulated numerically through the use of a new Eulerian-Lagrangian numerical technique. With this technique numerical dispersion and diffusion can be reduced to any desired level. GRA

N85-13402# Pacific Northwest Lab., Richland, Wash.
ATMOSPHERIC TRACER EXPERIMENTS IN A DEEP NARROW VALLEY
C. David Whiteman, Alan H. Huber (EPA, Research Triangle Park, N.C.), Richard W. Fisher (EPA, Denver, Colo.), and Bernard D. Zak (Sandia Labs, Albuquerque, N. Mex.) Aug. 1984 8 p refs Sponsored in part by DOE
(PB84-234590; EPA-600/D-84-206) Avail: NTIS HC A02/MF A01 CSCL 13B

A set of three atmospheric tracer experiments was conducted in the Brush Creek Valley of western Colorado as part of the U.S. EPA Green River Ambient Model Assessment program. Experiments are designed to determine how nighttime tracer concentrations on the valley floor and sidewalls arising from an elevated point source would change following sunrise during the temperature inversion break up period. Many physical processes are observed in the tracer and meteorological experiments, including nocturnal down valley plume transport and diffusion, post sunrise convection boundary layer (CBL) growth, fumigation of the elevated plume, upslope flow development within the CBL, subsidence over the valley center, and high post sunrise concentration on the sidewall. GRA

N85-13403# Environmental Protection Agency, Research Triangle Park, N.C.
VOC EMISSIONS FROM VOLATILE ORGANIC LIQUID STORAGE TANKS: BACKGROUND INFORMATION FOR PROPOSED STANDARDS
J. R. Farmer Jul. 1984 207 p refs
(PB84-237320; EPA-450/3-81-003A) Avail: NTIS HC A12/MF A01 CSCL 13B

Standards of Performance for the control of VOC emissions from volatile organic liquid (VOL) storage tanks are being proposed under the authority of Section 111 of the Clean Air Act. These standards would apply to all new and existing storage tanks having a capacity of 75 cubic meters or larger, which are to be used for the storage of VOL. Background information and environmental and economic impact assessments of the regulatory alternatives considered in developing the proposed standards are given. GRA

N85-13404# California Univ., Berkeley.
EFFECTS OF ACID RAIN ON PLANT MICROBIAL ASSOCIATIONS IN CALIFORNIA Final Research Report
D. Harris and E. A. Paul 13 Apr. 1984 69 p refs Sponsored by State of California

(PB84-242122; ARB-R-84/232) Avail: NTIS HC A04/MF A01 CSCL 13B

The effects of simulated acid rain of pH 5.6 to 3.0, with ionic composition similar to that found in California, on Trifolium repens, Lupinus densiflorus and L. benthamii grown in two soils were tested. The interactions of treatment intensity, soil type, phosphorus uptake and mycorrhizal influences on growth, carbon fixation and allocation and nitrogen fixation were determined. Acidic treatments generally decreased plant growth, nodulation and nitrogenase activity. The exposure of plants to a large number of simulated rainfall conditions of shorter duration did not result in the negative growth effects. Plants adequately supplied with P, either as fertilizer or by mycorrhizal fungi, were much more resistant to conditions caused by acidic precipitation and in some cases growth increases were found. Author (GRA)

N85-13345# Lisbon Univ. (Portugal). Inst. Geofisica.

THERMODYNAMIC CONDITIONS OF THE EARTH'S ATMOSPHERE WITH POLLUTION PROCESSES

A. S. Mendes *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 447-450 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

N85-13405 Stanford Univ., Calif.

GEOLOGY AND GEOCHEMICAL EVOLUTION OF THE LOST RIVER, ALASKA, TIN DEPOSIT Ph.D. Thesis

David Charles Dobson 1984 262 p refs
Avail: Univ. Microfilms Order No. DA8420514

The Sn-W-Be-F and base metal mineralization at Lost River occurs in stockwork vein skarn, greisen and breccia within and above the cupola of a late Cretaceous granite which intruded Ordovician limestone within 3 km of the surface. The mineralized intrusion was a highly evolved granite, derived from sialic crust, which formed primarily by volatile related fractionation mechanisms. It is suggested that early skarns formed from fluids at 350-400 C with salinities declining from 14 to 18 wt % NaCl to 9 to 15 wt%. Boiling fluids then caused greisenization of granite; concomitantly, residual fluids with enhanced salinity caused biotite plus hornblende deposition in skarn. Data from Lost River and other Sn deposits suggest that sudden pressure variation, fluid boiling may be a common prerequisite of Sn mineralization. It is suggested that the search for Sn deposits can be restricted to shallow settings where pressure fluctuation occurs via fracturing, and fluid communication with the surface. In the case of Sn skarns, shallow levels are critical because early silicates may contain significant Sn. The deposition of recoverable Sn is dependent on destruction of those phases by retrograde alteration, which is best accomplished at shallow levels. Dissert. Abstr.

N85-13406*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

PETROLOGIC MODEL OF THE NORTHERN MISSISSIPPI EMBAYMENT BASED ON SATELLITE MAGNETIC AND GROUND BASED GEOPHYSICAL DATA

Herman H. Thomas Jul. 1983 16 p refs Submitted for publication
(NASA-TM-85075; NAS 1.15:85075) Avail: NTIS HC A02/MF A01 CSCL 08G

Magnetization, derived from gravity-seismic data from the northern Mississippi Embayment, is evaluated relative to magnetization values obtained from satellite magnetic data. A magnetization contrast of approximately -0.54 A/m determined from the geophysical model compares favorably to a value of approximately -0.47 A/m from MAGSAT United States Apparent Magnetization contrast map. The negative magnetization contrast, required by the MAGSAT data, is unusual as rift zones with the exception of those which are currently active are associated with positive magnetization. The model presented favors an intrusion of low Curie temperature mafic rock at the base of the crust. Alternate possibilities, a shallow Curie isotherm or remanence in a direction other than that of the current main field, seem less likely as reported regional heat flow values are too low and remanence is attenuated at depth. Author

N85-13407*# California Inst. of Tech., Pasadena. Seismological Lab.

PARTICLE VELOCITY EXPERIMENTS IN ANORTHOSITE AND GABBRO

Mark B. Boslough and Thomas J. Ahrens [1984] 4 p refs
(Grant NGL-05-002-105)
(NASA-CR-174158; NAS 1.26:174158; Contrib-3949) Avail: NTIS HC A02/MF A01 CSCL 08K

Shock wave experiments were conducted in San Gabriel anorthosite and San Marcos gabbra 10 11 GPa using a 40 mm-borne propellant gun. Particle velocities were measured directly at several points in each target by means of electromagnetic gauges. Hugoniot states were calculated by determining shock-transit time from the gauge records. Sound speeds indicate a loss of shear strength upon sock compression for both rocks, with the strength loss persisting upon release to zero stress om the anorthosite. Stress-density release paths in the anorthosite indicate possible transformation of albite to jadeite + (quartz or coesite), with the amount of material transformed increasing as a function of shock stress. Electrical interferene effects in the gabbro precluded the determination of accurate release paths for the rock. M.G.

N85-13408*# State Univ. of New York, Albany. Research Foundation.

ARCHEAN SEDIMENTATION AND TECTONICS IN SOUTHERN AFRICA Final Technical Report, 1 Aug. 1983 - 31 Mar. 1984

William S. F. Kidd 1984 4 p
(Grant NAGw-487)
(NASA-CR-174156; NAS 1.26:174156) Avail: NTIS HC A02/MF A01 CSCL 08G

Sequences in the Barberton Mountain Land greenstone belt (southern Africa) were examined to determine the nature of the sedimentary rocks, their tectonic implications, and their bearing on the present large-scale structural condition of the belt. Also assessed was whether there was evidence for a significant component of shallow-water-deposited sedimentary rocks in the parent materials of the Limpopo belt. The nature of a largehigh strain zone on the southern margin of the central Limpopo belt was examined. R.S.F.

N85-13409*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

GLOBAL MATRIX OF THERMOSPHERIC DENSITY VALUES FOR SELECTED SOLAR/GEOMAGNETIC CONDITIONS AND SPACECRAFT ORBITAL ATTITUDES

Dale L. Johnson Dec. 1984 92 p refs
(NASA-TM-86478; M-471; NAS 1.15:86478) Avail: NTIS HC A05/MF A01 CSCL 04A

Presented are selected thermospheric/exospheric global mean and extreme density values computed between 130 and 1100 km altitude. These values were generated from the MSFC/J70 reference orbital atmospheric model using different input conditions of solar flux and geomagnetic index, ranging from low to peak. Typical magnitudes of day-night density changes are presented, as an example, for use in space vehicle orbital analyses. Author

N85-13410# California Univ., Livermore. Lawrence Livermore Lab.

BLIND ZONES AND ASPECT RATIO BIAS IN ACQUISITION OF DISCONTINUITY ORIENTATION DATA

J. L. Yow, Jr. 27 Oct. 1983 9 p refs Presented at 25th US

Symp. on Rock Mech., Evanston, Ill., 25 Jun. 1984
(Contract W-7405-eng-48)
(DE84-002718; UCRL-89960; CONF-840633-1) Avail: NTIS HC A02/MF A01

Characterization of discontinuities such as faults, shears, and joints in a rock mass is an integral part of many geotechnical data acquisition programs. Discontinuity orientations are in practice measures in rock core samples or are mapped from rock exposures. Data sets thus obtained are biased because of blind zones associated with each borehole or mapping surface. The extent of blind zones are quantified and a procedure for treating aspect ratio bias is outlined. DOE

N85-13411# Arizona Solar Energy Commission, Phoenix.
CO-2-SILICA GEOTHERMOMETER FOR LOW TEMPERATURE GEOTHERMAL RESOURCE ASSESSMENT, WITH APPLICATION TO RESOURCES IN THE SAFFORD BASIN, ARIZONA
J. C. Witcher and C. Stone Nov. 1983 159 p refs
(Contract De-FC03-80RA-50076)
(DE84-013958; DOE/RA-50076/T15) Avail: NTIS HC A08/MF A01

Silica-water reactions in low temperature geothermal water in areas near Safford, southeastern Arizona, were investigated and a pCO2 correction for conductive silica geothermometers was derived. Use and limitations of the technique are discussed. Data collection, interpretation approach, and basic geochemistry, are outlined. The geology, thermal regime, geohydrology, and gross geochemistry of the Safford area are reviewed. Geothermal potential is discussed. DOE

N85-13412# Los Alamos Scientific Lab., N. Mex.
PROCEEDINGS OF A WORKSHOP ON ATMOSPHERIC RESEARCH NEEDS FOR THE WESTERN UNITED STATES
T. Yamada, G. E. Streit, D. H. Nochumson, E. J. Mroz, W. E. Clements, and M. D. Williams Jun. 1984 41 p Proc. held in Los Alamos, N. Mex., 13-15 Mar. 1984
(Contract W-7405-eng-36)
(DE84-015069; LA-10109-C; CONF-8403136) Avail: NTIS HC A03/MF A01

Research needed to further the understanding of the atmospheric physics and chemistry over the energy rich regions of the western US was identified. Workshops included: transport and diffusion, chemical and physical transformation and deposition processes, and measurement and interpretation of western atmospheric constituents. DOE

N85-13413# Geological Survey, Laramie, Wyo.
SUBSURFACE TEMPERATURES IN NORTHEASTERN WYOMING MEASURED BY BOTTOM HOLE TEMPERATURE RECORDS
Kevin T. Kilty Dec. 1983 45 p refs
(TI84-901610; USGS-OFR-83-4) Avail: NTIS HC A03/MF A01

The value of subsurface temperature data in investigating groundwater flow in northeastern Wyoming was studied. The poor resolution of much of the temperature data set makes geohydrologic interpretations based on it inconclusive. However, the data are useful for estimating subsurface temperatures in geothermal assessments, correcting borehole and surface resistivity data, and calculating groundwater viscosity values in regional flow models. The data were presented in two forms: Temperature-depth relationships for specific portions of the study area; and a contour map of geothermal gradients estimated from the subsurface temperature measurements. Author

N85-13414# Sandia Labs., Albuquerque, N. Mex.
MODELS FOR VOLCANIC PROCESSES IN LONG VALLEY, CALIFORNIA: TESTING BY CONTINENTAL DRILLING
John B. Rundle 1984 22 p refs
(Contract DE-AC04-76DP-00789)
(DE84-014943; SAND-83-2638C) Avail: NTIS HC A02/MF A01

Recent tectonic activity in the Long Valley, California, caldera, occurring since 1978 is reviewed. A series of major earthquakes, combined with ground uplift, crustal strain, gravity changes, hydrothermal system changes, and earthquake swarm activity all suggest the recent existence of a significant high level magmatic intrusion as the root cause of the activity. These data are outlined here, along with a program to investigate the nature and current evolution of this active caldera system. Current activities and future plans are also discussed. DOE

N85-13415# Los Alamos Scientific Lab., N. Mex.
PLASMA FLOW IN THE NEAR AND DISTANT GEOMAGNETIC TAIL
E. W. Hones, Jr. 1984 43 p refs Presented at the 25th Plenary Session of COSPAR, Graz, Austria, 25 Jun. - 7 Jul. 1984
(Contract W-7405-eng-36)
(DE84-014029; LA-UR-84-1992; CONF-8406167-3) Avail: NTIS HC A03/MF A01

Magnetotail plasma flow measurements by the ISEE-3 satellite at distances as great as 230 R sub E have been instrumental in fixing the average location of the distant neutral line at approx. 60 to 120 R sub E and in identifying plasmoids (i.e., severed sections of the plasma sheet), released during substorms and escaping down tail. The features of magnetotail plasma flow are reviewed, the most recent observations are described, and their implications for magnetospheric physics are discussed. DOE

N85-13416# Los Alamos Scientific Lab., N. Mex.
EARTHQUAKE CATALOG FOR NORTHERN NEW MEXICO Progress Report, Apr. - Jun. 1982
D. J. Cash, K. H. Olsen, J. N. Stewart, and J. J. Wolff Jun. 1984 13 p refs
(Contract W-7405-eng-36)
(DE84-016984; LA-10139-PR) Avail: NTIS HC A02/MF A01

A summary of the earthquakes located in northern New Mexico by the Los Alamos National Laboratory seismic array is given. Data are presented in the form of tables and epicenter maps, with a brief explanatory text. DOE

N85-13417# Los Alamos Scientific Lab., N. Mex. Earth and Space Sciences Div.
RIO GRANDE RIFT: PROBLEMS AND PERSPECTIVES
W. Scott Baldridge, Kenneth H. Olsen, and Jonathan F. Callender (New Mexico Museum of Natural History, Albuquerque) 1984 48 p refs Presented at the New Mexico Geol. Soc. Guidebook 35th Ann. Conf., Taos, N. Mex., 10-13 Oct. 1984
(Contract W-7405-eng-36)
(DE84-015492; LA-UR-84-2114; CONF-8410128-1) Avail: NTIS HC A03/MF A01

Topics and ideas addressed include: (1) the regional extent of the Rio Grande rift; (2) the structure of the crust and upper mantle; (3) whether the evidence for an axle dike in the lower crust is compelling; (4) the nature of faulting and extension in the crust; and (5) the structural and magmatic development of the rift. DOE

N85-13418# National Academy of Sciences - National Research Council, Washington, D. C.
PRIORITIES FOR A NATIONAL PROGRAM OF CONTINENTAL DRILLING FOR SCIENTIFIC PURPOSES Interim Report, Jan. 1980 - Jan. 1984
Jul. 1984 21 p refs Sponsored by Geological Survey
(Contract DE-FG02-80ER-10670; Grants NSF EAR-80-14918; N00014-81-G-0100)
Avail: NTIS HC A02/MF A01 CSCL 08G

Panels of the Continental Scientific Drilling Committee (CSDC) have established priorities within the areas for which they have responsibility: thermal regimes, basement structure and deep continental basins, active fault zones and downhole measurements, and mineral resources. These high priority projects were evaluated against the standards of scientific significance. Under these constraints the CSDC determined that (1) a continuing National Program of Continental Scientific Drilling is required, extending over a period of decades and dealing with a variety of critical problems in continental crustal structure, development, and tectonics; and (2) the experiment with highest immediate priority in what is expected to be a long term and scientifically rewarding program is a dedicated research hole in the Southern Appalachians to test the thin skinned tectonics model of crustal structure. GRA

N85-13419# National Oceanic and Atmospheric Administration, Boulder, Colo.

ATLAS OF POLAR CAP ENERGETIC PARTICLE OBSERVATIONS. VOLUME 1: TIROS-N, 1 JANUARY 1979 - 28 FEBRUARY 1981

H. H. Sauer Aug. 1984 98 p refs

(PB84-233402; NOAA-DR-ERL-SEL-3) Avail: NTIS HC A05/MF A01 CSCL 04A

The instruments constitute the Energetic Particle Sensors (EPS) measure the flux of protons (ions) and electrons mirroring, and precipitating into, the top of the polar atmosphere. Graphical displays of the polar cap averages of the proton and electron fluxes precipitating into the polar atmosphere, over the energy range of 30 keV to greater than 80 MeV for protons and greater than 300 keV for electrons. Data over the operational lifetime of the TIROS-N spacecraft from 1 January 1979 to 28 February 1981. GRA

N85-13420# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.

MEASUREMENT OF RANGE-RESOLVED WATER VAPOR CONCENTRATION BY COHERENT CO2 DIFFERENTIAL ABSORPTION LIDAR

R. M. Hardesty Mar. 1984 269 p refs

(PB84-236892; NOAA-TM-ERL-WPL-118; NOAA-84082003) Avail: NTIS HC A12/MF A01 CSCL 04A

The feasibility of measuring differential absorption lidar (DIAL) species concentrations with a coherent CO2 lidar is examined. A computer simulation estimated errors in coherent and incoherent CO2 DIAL measurements due to speckle, noise, turbulence, and atmospheric inhomogeneities. Results indicate that direct-detection is the preferable mode at shorter ranges while heterodyne detection provides better sensitivity beyond a few kilometers. The NOAA pulsed lidar was used to investigate statistical properties of the aerosol backscattered returns that are processed to obtain DIAL measurements. The first range-resolved coherent DIAL water vapor measurements were made with the lidar to ranges beyond 10 km. Estimates compared reasonably with those from rawinsondes, although some tendency to overestimate relative to the sondes was observed. Author (GRA)

N85-13284# Geological Survey, Alexandria, Va.

SUMMARY OF LANDSAT QUADRANGLE STUDIES IN ALASKA

James R. LeCompte, William Clinton Steele, and Nairn R. D. Albert *In its* The United States Geol. Survey in Alaska 1984 p 1-4 refs (For primary document see N85-13283 04-42)

Avail: Issuing Activity

N85-13285# Geological Survey, Alexandria, Va.

DIGITAL ELEVATION MODELS IMPROVE PROCESSING OF ALASKAN GRAVITY DATA

David F. Barnes *In its* The United States Geol. Survey in Alaska 1984 p 5-6 refs (For primary document see N85-13283 04-42)

Avail: Issuing Activity

N85-13286# Geological Survey, Alexandria, Va.

SEISMIC STUDIES IN SOUTHERN ALASKA

Christopher D. Stephens, John C. Lahr, and Robert A. Page *In its* The United States Geol. Survey in Alaska 1984 p 7-9 ref (For primary document see N85-13283 04-42)

Avail: Issuing Activity

N85-13287# Geological Survey, Alexandria, Va.

HORIZONTAL-STRAIN OBSERVATIONS IN THE SHUMAGIN ISLAND AND YAKATAGA SEISMIC GAPS, ALASKA

Michael Lisowski, James C. Savage, and William H. Prescott *In its* The United States Geol. Survey in Alaska 1984 p 9-10 refs (For primary document see N85-13283 04-42)

Avail: Issuing Activity

N85-13291# Geological Survey, Alexandria, Va.

RECONNAISSANCE GEOLOGY OF THE NORTHERN PART OF THE UNALAKLEET QUADRANGLE

William W. Patton, Jr. and Elizabeth J. Moll *In its* The United States Geol. Survey in Alaska 1984 p 24-27 refs (For primary document see N85-13283 04-42)

Avail: Issuing Activity

N85-13292# Geological Survey, Alexandria, Va.

NEWLY RECOGNIZED SEDIMENTARY ENVIRONMENTS IN THE SHELIKOF FORMATION, ALASKA

William H. Allaway, Jr. and John W. Miller *In its* The United States Geol. Survey in Alaska 1984 p 34-37 refs (For primary document see N85-13283 04-42)

Avail: Issuing Activity

N85-13294# Geological Survey, Alexandria, Va.

CONCORDANT BANDS OF AUGEN GNEISS WITHIN METASEDIMENTARY ROCKS IN THE BIG DELTA C-2 QUADRANGLE, EAST-CENTRAL ALASKA

Cynthia Dusel-Bacon and Charles R. Bacon *In its* The United States Geol. Survey in Alaska 1984 p 48-50 refs (For primary document see N85-13283 04-42)

Avail: Issuing Activity

N85-13295# Geological Survey, Alexandria, Va.

METAMORPHIC PETROLOGY OF THE TABLE MOUNTAIN AREA, CIRCLE QUADRANGLE, ALASKA

Anna C. Burack, Jo Laird, Helen L. Foster, and Grant W. Cushing *In its* The United States Geol. Survey in Alaska 1984 p 54-57 refs (For primary document see N85-13283 04-42)

Avail: Issuing Activity

N85-13296# Geological Survey, Alexandria, Va.

PALEOZOIC LIMESTONES OF THE CRAZY MOUNTAINS AND VICINITY, CIRCLE QUADRANGLE, EAST-CENTRAL ALASKA

Helen L. Foster, Florence R. Weber, and J. Thomas Dutro, Jr. *In its* The United States Geol. Survey in Alaska 1984 p 60-62 refs (For primary document see N85-13283 04-42)

Avail: Issuing Activity

N85-13298# Geological Survey, Alexandria, Va.

STRUCTURAL OBSERVATIONS IN THE CIRCLE QUADRANGLE, YUKON-TANANA UPLAND, ALASKA

Grant W. Cushing and Helen L. Foster *In its* The United States Geol. Survey in Alaska 1984 p 64-65 ref (For primary document see N85-13283 04-42)

Avail: Issuing Activity

N85-13299# Geological Survey, Alexandria, Va.

LACUSTRINE AND EOLIAN DEPOSITS OF WISCONSIN AGE AT RIVERSIDE BLUFF IN THE UPPER TANANA RIVER VALLEY, ALASKA

L. David Carter and John P. Galloway *In its* The United States Geol. Survey in Alaska 1984 p 66-68 refs (For primary document see N85-13283 04-42)

Avail: Issuing Activity

N85-13300# Geological Survey, Alexandria, Va.

GLACIAL-LAKE DEPOSITS IN THE MOUNT HARPER AREA, YUKON-TANANA UPLAND

Florence R. Weber and Thomas A. Ager *In its* The United States Geol. Survey in Alaska 1984 p 68-70 refs (For primary document see N85-13283 04-42)

Avail: Issuing Activity

N85-13301# Geological Survey, Alexandria, Va.

STRATIGRAPHY, PETROLOGY, AND STRUCTURE OF THE PINGSTON TERRANE, MOUNT HAYES C-5 AND C-6 QUADRANGLES, EASTERN ALASKA RANGE, ALASKA

Warren J. Nokleberg, Carl E. Schwab, Ronny T. Miyaoka, and Carol L. Buhrmaster *In its* The United States Geol. Survey in Alaska 1984 p 70-73 refs (For primary document see N85-13283

04-42)
Avail: Issuing Activity

N85-13303# Geological Survey, Alexandria, Va.
PALEOGENE VOLCANIC ROCKS OF THE MATANUSKA VALLEY AREA AND THE DISPLACEMENT HISTORY OF THE CASTLE MOUNTAIN FAULT
Miles L. Silberman and Arthur Grantz *In its* The United States Geol. Survey in Alaska 1984 p 82-86 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

N85-13305# Geological Survey, Alexandria, Va.
THE NORTHERN COAST PLUTONIC-METAMORPHIC COMPLEX, SOUTHEASTERN ALASKA AND NORTHWESTERN BRITISH COLUMBIA
David A. Brew and Arthur B. Ford *In its* The United States Geol. Survey in Alaska 1984 p 120-124 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

N85-13306# Geological Survey, Alexandria, Va.
CRETACEOUS PLUTONIC ROCKS, MITKOF AND KUPREANOF ISLANDS, PETERSBURG QUADRANGLE, SOUTHEASTERN ALASKA
Peter D. Burrell *In its* The United States Geol. Survey in Alaska 1984 p 124-126 ref (For primary document see N85-13283 04-42)
Avail: Issuing Activity

N85-13307# Geological Survey, Alexandria, Va.
LATE OLIGOCENE GABBRO NEAR KETCHIKAN, SOUTHEASTERN ALASKA
Richard D. Koch and Raymond L. Elliott *In its* The United States Geol. Survey in Alaska 1984 p 126-128 refs (For primary document see N85-13283 04-42)
Avail: Issuing Activity

N85-13315# European Space Agency. European Space Research and Technology Center, ESTEC, Noordwijk (Netherlands). Dept. de Ciencias Espaciales.
THE EARTH MAGNETOSPHERE: A CHARGED PARTICLE ACCELERATOR [LA MAGNETOSFERA TERRESTRE: UN ACELERADOR DE PARTICULAS CARGADAS]
V. Domingo *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 83-103 refs In SPANISH (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13316# Deutsche Akademie der Wissenschaften, Berlin (East Germany). Zentralinst. fuer Solar-Terrestrische Physik.
RELATIONS BETWEEN THE PARTICLE PRECIPITATION EVENTS IN MID-LATITUDES, THE RING CURRENT INTENSITY AND THE POLARITY OF THE INTERPLANETARY MAGNETIC FIELD
E. A. Lauter *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 105-111 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13317# San Fernando Marine Observatory, Cadiz (Spain).
PRESENT PRACTICE FOR THE RECORDING OF THE EARTH MAGNETIC FIELD [ALTERNATIVAS ACTUALES PARA EL REGISTRO DEL CAMPO MAGNETICO TERRESTRE]
M. Catalan *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 113-124 refs In SPANISH (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13318# National Center for Atmospheric Research, Boulder, Colo. High Altitude Observatory.
ADVANTAGES AND LIMITATIONS OF SPHERICAL HARMONIC ANALYSES OF GEOMAGNETIC DATA
S. Matsushita *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 125-134 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13319# Kyoto Univ. (Japan). Inst. of Geophysics.
ANALYSIS OF THE DAILY GEOMAGNETIC VARIATION WITH THE USE OF MAGSAT DATA
H. Maeda *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 135-145 refs (For primary document see N85-13308 04-42)
(Grant JAPAN-MESC-446040(1979))
Avail: NTIS HC A23/MF A01

N85-13320# Geological Survey, Denver, Colo.
RESEARCH DIRECTIONS IN RECENT STUDIES OF THE LUNAR GEOMAGNETIC EFFECTS
W. H. Campbell *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 147-154 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13321# Goettingen Univ. (West Germany). Inst. fuer Geophysik.
ON DERIVATION AND SIGNIFICANCE OF GEOMAGNETIC EQUIVALENT AMPLITUDE INDICES
M. Siebert, J. Meyer, and D. Damaske (Freie Univ.) *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 155-168 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13322# Observatorio del Ebro, Roquetas (Spain).
A DIRECTLY OBTAINED GEOMAGNETIC ACTIVITY MEASURE, J3
E. J. Chernosky *In its* Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 169-173 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13323# Tohoku Univ., Sendai (Japan). Inst. of Geophysics.
RESONANCE MODEL OF Pc3 IN SUBTROPICAL REGIONS
T. Saito *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 175-180 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13324# Geological Survey, Denver, Colo.
RESEARCH DIRECTIONS IN RECENT STUDIES OF THE LUNAR GEOMAGNETIC EFFECTS
W. H. Campbell *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 147-154 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13325# Energy, Mines and Resources Canada, Ottawa (Ontario). Earth Physics Branch.
DAILY MAGNETIC VARIATIONS AT EBRO, SPAIN
J. C. Gupta *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 189-198 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13326# Istituto Nazionale di Geofisica, Rome (Italy).
ON THE ANNUAL AND SEMIANNUAL VARIATION OF S SUB R AT L'AQUILA
A. Meloni and F. Molina *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 199-213 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13327# Indian Inst. of Geomagnetism, Bombay.
ON SOME NEW FEATURES OF SEMIANNUAL VARIATION OF THE GEOMAGNETIC FIELD
B. N. Bhargava and D. R. K. Rao *In* Observatorio del Ebro Sci.

Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 215-224 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13328# Institut Royal Meteorologique de Belgique, Brussels.
LOCAL GEOMAGNETIC CHARACTERISTICS OF SOLAR ACTIVITY (DOURBES 1960-1978)
F. DeMeyer and A. DeVuyst *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 225-238 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13329# Institute of Geological Sciences, Edinburgh (Scotland).
GEOMAGNETIC SECULAR VARIATION: A JERK IN 1970
S. R. C. Malin, B. M. Hodder, and D. R. Barraclough *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 239-256 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13330# Helsinki Univ. (Finland). Dept. of Geophysics.
COMPARISONS OF SECULAR VARIATION IN TWO-DIPOLE AND SPHERICAL HARMONIC MODELS WITH OBSERVATORY DATA IN EURASIA, 1965-1975
H. Nevanlinna and C. Sucksdorff *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 257-270 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13331# National Inst. of Polar Research, Tokyo (Japan).
GEOMAGNETIC SECULAR VARIATION AT EBRO OBSERVATORY DURING THE PAST 70 YEARS
T. Nagata *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 271-276 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13332# Cambridge Univ. (England). Dept. of Geodesy and Geophysics.
REVERSALS OF THE EARTH'S MAGNETIC FIELD
J. A. Jacobs *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 277-298 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13333# Oslo Univ. (Norway).
DAYSIDE CUSP AURORA
A. Egeland, K. Henriksen (Tromsoe Univ., Norway), P. E. Sandholt (Tromsoe Univ., Norway), C. S. Deehr (Alaska Univ., Fairbanks), and G. G. Sivjee (Alaska Univ., Fairbanks) *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 299-312 refs Original contains color illustrations (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13334# Freiburg Univ. (West Germany).
SOURCES OF INFORMATION CONCERNING THE IONOSPHERE
K. Rawer *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 313-324 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13335# Science Research Council, Slough (England). Rutherford and Appleton Labs.
ON THE STUDY OF IONOSPHERIC DISTURBANCES
H. Rishbeth *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 325-326 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13336# University Coll. of Wales, Aberystwyth. Dept. of Physics.
THE RESPONSE OF MID-LATITUDE TOTAL ELECTRON CONTENT TO SOLAR ACTIVITY
L. Kersley and J. Green *In* Observatorio Del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 327-333 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13337# Air Force Geophysics Lab., Hanscom AFB, Mass.
IONOSPHERIC SCINTILLATION: A BRIEF REVIEW
J. P. Mullen, J. Aarons, and E. M. MacKenzie (Emmanuel Coll., Boston) *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 335-350 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13338# Max-Planck-Inst. fuer Aeronomie, Katlenburg-Lindau (West Germany).
THE WINTER ANOMALY IN IONOSPHERIC ABSORPTION (WITH SPECIAL REFERENCE TO THE RESULTS OBTAINED IN SPAIN)
W. Dieminger *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 351-357 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13339# Comision Nacional de Investigacion del Espacio, Madrid. Grupo Cientifico de Meteorologica.
POSSIBLE ANOMALY PREDICTION SYSTEM FOR THE MIDDLE ATMOSPHERE [POSIBLE SISTEMA DE PREDICTION DE ANOMALIAS EN LA ATMOSFERA MEDIA]
B. A. DeLaMorena *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 359-374 refs In SPANISH (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13340# National Physical Lab., New Delhi (India).
MIDDLE ATMOSPHERIC IONIZATION. OBSERVATIONS AND CHEMISTRY
A. P. Mitra *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 375-410 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13346# San Calixto Observatory, La Paz (Bolivia).
SEISMOLOGY TODAY [SISMOLOGIA HOY]
R. Cabre *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 451-457 refs In SPANISH (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13347# Javeriana Univ., Bogota (Colombia). Inst. Geofisico de Los Andes Colombianos.
CHARACTERISTICS OF A RECENT COLUMBIAN EARTHQUAKE, DECEMBER 12, 1979 [CARACTERISTICAS DEL RECIENTE TERREMOTO COLOMBIANO DEL 12 DE DICIEMBRE DE 1979]
J. E. Ramirez *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 459-488 In SPANISH (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13348# MacQuarie Univ., North Ryde (Australia). School of Earth Sciences.
LOVE AND RAYLEIGH WAVES IN IRREGULAR GROUND
L. A. Drake *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 489-504 refs (For primary document see N85-13308 04-42)
(Grant NSF EAR-76-00118)
Avail: NTIS HC A23/MF A01

N85-13349# Instituto Geografico Nacional, Madrid (Spain).
A REVIEW OF SEISMICITY IN PENINSULAR SPAIN [REVISION DE LA SISMICIDAD DE LA ESPANA PENINSULA]
J. Mezcua and A. Lopez Arroyo *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 505-514 refs In SPANISH (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13350# Observatorio Geofisico Central de Toledo (Spain). Observatorio Geofisico Central.
STRUCTURE OF THE CRUST AND UPPER MANTLE OF THE IBERIAN CONTINENTAL PLATFORM [ESTRUCTURA DE LA CORTEZA Y MANTO SUPERIOR DE LA PLATFORMA CONTINENTAL IBERICA]
G. Payo, J. Sierra, and E. RuizdelaParte *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 515-526 refs In SPANISH (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13351# Institut de Physique du Globe, Paris (France).
DEEP STRUCTURE BENEATH THE PYRENEES
A. Souriau *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Aniiv. 1983 p 527-536 refs In FRENCH; ENGLISH summary (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13352# Universidad Complutense, Madrid (Spain). Catedra de Geofisica.
DEEP STRUCTURE AND SEISMICITY IN THE CATALONIA-PYRENEES REGION [ESTRUCTURA PROFUNDA Y SISMICIDAD DE LA REGION CATALUNA-PIRINEOS]
A. Roca, E. Surinach, A. Udias, and E. Banda *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 537-547 refs In SPANISH (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13547# Joint Publications Research Service, Arlington, Va.
THEORETICAL AND OBSERVED DISPERSION OF ACOUSTIC-GRAVITY WAVES IN ATMOSPHERE
Tu Yan *In its* China Rept.: Sci. and Technol. (JPRS-CST-84-001) 16 Jan. 1984 p 13-23 refs Transl. into ENGLISH from Xhengxue Xuebao (Beijing), v. 8, no. 4, Jul. 1983 p 227-235 (For primary document see N85-13545 04-70)
Avail: NTIS HC A03/MF A01

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N85-13421# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
HEAT SOURCES IN THE TROPICS AND LARGE SCALE FLOW ANOMALIES ASSOCIATED WITH PRECIPITATION ANOMALIES IN NORTHEAST BRAZIL M.S. Thesis [FONTES DE CALOR NOS TROPICOS E ESCOAMENTOS ANOMA LOS DE LARGA ESCALA ASSOCIADAS COM ANOMALIAS DE PRECIPITACAO NO NORDESTE DO BRASIL]
Pablo Nobre Jul. 1984 98 p refs In PORTUGUESE; ENGLISH summary
(INPE-3211-TDL/175) Avail: NTIS HC A05/MF A01

An analysis in the monthly departure of the relative vorticity field over the globe and monthly departures of the sea surface temperature (SST) in the Tropical Atlantic Ocean is performed for years of droughts and floods over northeast Brazil, in the period from 1963 to 1980. Planetary scale wavelike patterns were observed in the relative vorticity field, similar to those found in previous theoretical and observational studies. Of major interest, is the phase coherence of the wavelike patterns of circulation anomalies over the Northern Hemisphere and the precipitation regime over northeast Brazil. Such phase coherence, in addition to the occurrence of SST anomalies in the Tropical Atlantic Ocean (with warmer waters in the north and colder in the south of the equator for drought years, and the reverse for flood years), indicates that the existence of global scale wavelike patterns in relative vorticity field, as well as the variability of the precipitation regime over northeast Brazil are, respectively, the remote and local response of the atmosphere to a tropical thermal forcing. Author

N85-13422*# Oregon State Univ., Corvallis. Dept. of Atmospheric Sciences.
AN ALTERNATIVE TO REDUCTION OF SURFACE PRESSURE TO SEA LEVEL
J. W. Deardorff 1982 12 p refs
(Grant NAG5-51)
(NASA-CR-174174; NAS 1.26:174174) Avail: NTIS HC A02/MF A01 CSCL 04B

The pitfalls of the present method of reducing surface pressure to sea level are reviewed, and an alternative, adjusted pressure, P, is proposed. P is obtained from solution of a Poisson equation over a continental region, using the simplest boundary condition along the perimeter or coastline where P equals the sea level pressure. The use of P would avoid the empiricisms and disadvantages of pressure reduction to sea level, and would produce surface pressure charts which depict the true geostrophic wind at the surface. Author

N85-13423# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
A FEASIBILITY STUDY ON THE USE OF WIND PROFILERS TO SUPPORT SPACE SHUTTLE LAUNCHES Final Report
R. B. Chadwich, A. S. Frisch, and R. G. Strauch Washington NASA Dec. 1984 115 p refs
(NASA-CR-3861; NAS 1.26:3861) Avail: NTIS HC A06/MF A01 CSCL 04B

The use of a clear air radar wind profile to support space shuttle launches by measuring prelaunch winds aloft is described. These winds are currently measured by Jimspheres tracked with a high resolution radar. This technique provides a single high resolution wind profile from the surface to about 18 km. Two operational disadvantages of the Jimsphere/radar tracking system are that it takes about 1.0 hour to measure a wind profile to the required altitude and that the wind profile applies only to the path of the ascending Jimsphere balloon. This difference in location may be up to 70 km, during very high winds, from the actual trajectory of the Space Shuttle in the maximum inflight dynamic pressure region. The radar wind Profiler automatically measures the motion of natural tracers of the atmosphere almost directly over the radar site. The accuracy and resolution of the radar wind Profiler is a function of the integration time and the resolution used to obtain the wind profile measurements. Radar wind Profiler systems operate at significantly less altitude resolution than does the Jimsphere/radar tracking system and integrate over 30 minutes or longer for a wind profile measurement. The potential for achieving altitude resolution and accuracy approaching the Jimsphere/radar tracking system capabilities with respect to frequency cost trade offs and assumptions on bandwidth, frequency interference, and other system characteristics are described. E.A.K.

N85-13424*# Cooperative Inst. for Research in the Atmosphere, Fort Collins, Colo.
INVESTIGATIONS OF SEVERE/TORNADIC THUNDERSTORM DEVELOPMENT AND EVOLUTION BASED ON SATELLITE AND AVE/SESAME/VAS DATA Final Technical Report
Thomas H. VonderHaar and James F. W. Purdon Dec. 1984 9 p Sponsored in part by Colorado State Univ.
(Grant NAGw-504)
(NASA-CR-174154; NAS 1.26:174154) Avail: NTIS HC A02/MF A01 CSCL 04B

The use of rapid scan satellite imagery to investigate the local environment of severe thunderstorms is discussed. Mesoscale cloud tracking and vertical wind shear as it affects thunderstorm relative flow are mentioned. The role of pre-existing low level cloud cover in the outbreak of tornadoes was investigated. Applying visible atmospheric sounding imagery to mesoscale phenomena is also addressed. R.S.F.

N85-13425# Pacific Northwest Lab., Richland, Wash.
METEOROLOGICAL ANALYSIS FOR CLUSTERS OF WIND TURBINES Interim Report
David C. Powell May 1984 53 p refs
(Contract DE-AC06-76RL-01830)
(DE84-013164; PNL-5024) Avail: NTIS HC A04/MF A01

A demonstration qualifying the meteorological spectral gap hypothesis is given. It is shown that the peak in the micrometeorological frequency range is at an anomalous level according to a demonstration made using a state-of-the-art micrometeorological spectrum. A spectral model for calculation of rms values for the unstable atmosphere is presented. It is found that theoretically the rms of the unstable atmosphere is about 1.7 times that of the neutral atmosphere when the frequency band considered is one cycle per 30 minutes to one cycle per minute. A spectral model for spatial correlation in neutral conditions is suggested. It is based on Fourier transformation of the above-mentioned spectrum. DOE

N85-13426# Massachusetts Univ., Amherst.
CLIMATE OF THE NORTHERN HEMISPHERE, 1851 - 1900 COMPARED TO CONTEMPORARY CLIMATE Annual Report
R. S. Bradley, P. M. Kelly (East Anglia Univ.), P. D. Jones (East Anglia Univ.), H. F. Diaz (NOAA, Boulder, Colo.), R. G. Barry (East Anglia Univ.), and C. M. Goodess Jun. 1984 23 p refs
(Contract DE-AC02-81EV-10739)
(DE84-016368; DOE/EV-10739/1; AR-3) Avail: NTIS HC A02/MF A01

Progress is reported on the following objectives: (1) the synthesis and documentation of the DOE data bank, including the production of a technical report describing the data bank; (2) gridding of the station data and production of an extended Northern Hemisphere temperature record; (3) preparation of the late 19th century gridded data in atlas and/or movie format; and (4) further studies of the reliability of the 19th century surface pressure data set. DOE

N85-13427# Pacific Northwest Lab., Richland, Wash.
SUBHOURLY WIND FORECASTING TECHNIQUES FOR WIND TURBINE OPERATIONS
H. L. Wegley, M. R. Kosorok, and W. J. Formica Aug. 1984 41 p refs
(Contract DE-AC06-76RL-01830)
(DE84-016205; PNL-4894) Avail: NTIS HC A03/MF A01

Three models for making automated forecasts of subhourly wind and wind power fluctuations were examined to determine the models' appropriateness, accuracy, and reliability in wind forecasting for wind turbine operation. Such automated forecasts appear to have value not only in wind turbine control and operating strategies, but also in improving individual wind turbine operating strategies (such as determining when to attempt startup). A simple persistence model, an autoregressive model, and a generalized equivalent Markhov (GEM) model were developed and tested using spring season data from the WKY television tower located near Oklahoma City, Oklahoma. The three models represent a pure measurement approach, a pure statistical method and a statistical-dynamical model, respectively. Forecasting models of wind speed means and measures of deviations about the mean were developed and tested for all three forecasting techniques for the 45-meter level and for the 10-, 30- and 60-minute time intervals. DOE

N85-13428# California Univ., Livermore. Lawrence Livermore Lab.
TRENDS IN OZONE AND TEMPERATURE STRUCTURE: COMPARISON OF THEORY AND MEASUREMENTS
Donald J. Wuebbles Aug. 1984 6 p refs Presented at the Quadren. Ozone Symp., Halkidiki, Greece, 3 Sep. 1984
(Contract W-7405-eng-48)
(DE84-016201; UCRL-90296; CONF-8409122-1) Avail: NTIS HC A02/MF A01

Comparison of model calculated trends in ozone and temperature to inferred variations in trace gas concentrations and solar flux, is made with available analyses of observations. In general, the calculated trends in total ozone and the vertical ozone distribution agree well with the measured trends. However, there are too many remaining theoretical and sampling uncertainties to establish causality. Although qualitatively in agreement, the observed temperature decrease in the upper stratosphere is significantly larger than that calculated. Theoretical results suggest a significant influence on stratospheric ozone from solar flux variations, but observational evidence is at best inconclusive. Overall, the trend comparisons tend to be consistent with the hypothesis that several different anthropogenic influences are affecting the present global atmosphere. DOE

N85-13429# California Univ., Livermore. Lawrence Livermore Lab.
RELATIONSHIP BETWEEN MODEL COMPLEXITY AND DATA BASE QUALITY FOR COMPLEX TERRAIN TRACER EXPERIMENTS
Rolf Lange and Leonard O. Myrup (California Univ., Davis) Jul. 1984 7 p refs Presented at the 3rd American Meteorological Society Conf. on Mountain Meteorology, Portland, Ore., 15-19 Oct. 1984 Submitted for publication
(Contract W-7405-eng-48)
(DE84-015022; UCRL-90747; CONF-841059-8) Avail: NTIS HC A02/MF A01

The relationship between numerical air quality model complexity and experimental data base quality (density) was examined for tracer scenarios in complex terrain under stable nighttime conditions. To eliminate model to model incompatability and resolution variables, a single particle in cell model was used that can be operated in a range of complexity from a three dimensional time variable transport and diffusion model, with terrain, to a simple, steady state Gaussian plume model. The experimental data set used consists of extensive meteorological data and tracer samples taken during a night time drainage flow release scenario in an 8 km long valley. By systematically reducing the information in the meteorological part of this data set, a number of data sets of decreasing quality were constructed. DOE

N85-13430# Argonne National Lab., Ill.
CLIMATOLOGICAL VARIABILITY IN MODELING OF LONG-TERM REGIONAL TRANSPORT AND DEPOSITION OF AIR POLLUTANTS
J. D. Shannon 1984 5 p refs Presented at 3rd Am. Meteorol. Soc. Conf. on Mt. Meteorol., Portland, Oreg., 15 Oct. 1984
(Contract W-31-109-eng-38)
(DE84-014726; CONF-841059-4) Avail: NTIS HC A02/MF A01

Two years of meteorological data were used in the advanced statistical trajectory regional air pollution (ASTRAP) model. Deposition for the source receptor matrix combination of 11 source regions and nine receptors are estimated. DOE

N85-13431# California Univ., Livermore. Lawrence Livermore Lab.
COMPARISON BETWEEN TRACER MEASUREMENTS AND MODEL CALCULATIONS FOR NIGHTTIME DRAINAGE FLOWS IN COMPLEX TERRAIN
K. T. Foster and M. H. Dickerson Jun. 1984 5 p refs Presented at 3rd Am. Meteorol. Soc. Conf. on Mt. Meteorol., Portland, Oreg., 15 Oct. 1984
(Contract W-7405-eng-48)
(DE84-014709; UCRL-90550; CONF-841059-5) Avail: NTIS HC A02/MF A01

The Geysers area of northern California, in which nonreactive tracers were released from different locations within or near nighttime drainage flows were investigated. The results were used to evaluate a three dimensional mars consistent diagnostic wind field model (MATHEW) and a particle in cell transport and diffusion model (APDIC). DOE

N85-13432# Brookhaven National Lab., Upton, N. Y. Dept. of Applied Science.
TRANSFORMATION PROCESSES AND WET DEPOSITION ON THE URBAN SCALE
A. A. N. Patrinos, R. L. Tanner, and R. M. Brown 1984 4 p refs Presented at 4th Joint Conf. on Appl. of Air Pollution Meteorol., Portland, Oreg., 15-19 Oct. 1984
(Contract DE-AC02-76CH-00016)
(DE84-015294; BNL-35032; CONF-841059-9) Avail: NTIS HC A02/MF A01

Preliminary results are given from a study addressing the potential contribution of urban emissions to the total acid wet deposition load downwind of a large city and the spatial variability of this deposition on the suburban-rural scale. Philadelphia was chosen as a test site because it has substantial and well-documented emissions and because it is sufficiently inland to minimize complications from a purely coastal location. Emphasis was placed on frontal type precipitation. DOE

N85-13433# California Univ., Livermore. Lawrence Livermore Lab.
EFFECT OF MOUNTAIN WAVE DYNAMICS ON OROGRAPHIC STORMS
M. M. Bradley and R. B. Wilhelmson (Illinois Univ., Urbana) Jun. 1984 4 p refs Presented at 3rd Am. Meteorol. Soc. Conf. on Mt. Meteorol., Portland, Oreg., 15 Oct. 1984 Submitted for publication
(Contract W-7405-eng-48)
(DE84-014713; UCRL-90795; CONF-841059-6) Avail: NTIS HC A02/MF A01

A review of the atmospheric structure of eight orographic storms over the Glamorgon Hills of south Wales indicates that mountain waves may be fairly common within such storms. Numerical simulation using a new, dynamic model tend to confirm the presence of these waves. The model results strongly support the hypothesis that mountain wave effects were responsible for the previously unexplained sensitivity of the Bergeron seeder-feeder mechanism to the low-level wind speed. DOE

N85-13434# Royal Netherlands Meteorological Inst., De Bilt.
ACQUISITION AND STORAGE OF CABAUW MEASUREMENTS: A SYSTEM PROPOSAL [INZAMELING EN OPSLAG VAN CABAUWMETINGEN: EEN SYSTEEMVOORSTEL]
A. C. M. Beljaars, G. D. G. Folkers, R. A. Hoenson, and A. Unlandt Jan. 1984 57 p refs In DUTCH
(KNMI-TR-48) Avail: NTIS HC A04/MF A01

The future measuring program of the Cabauw mast was prepared. The program has three purposes: the measurements are processed to meteorological reports; they are stored for research and climatological data; and the program is a background for experiments taking place at Cabauw. The first two purposes have a strongly operational character and require a system with a high availability. A global proposal is made for data preprocessing in Cabauw, data transport to the Royal Dutch Meteorological Institute (KNMI) at De Bilt, and data storage in De Bilt. Each of these subjects are presented in separate chapters. The proposal is based on a configuration whereby the data reduction takes place in Cabauw, the reduced data in bulletin-form are sent via a fixed line to the datacomprocessor (PDP11) at De Bilt, and the archiving is made on the B6800 computer. Author (ESA)

N85-13435# Royal Netherlands Meteorological Inst., De Bilt. Dynamische Meteorologish Onderzoek.
OPERATIONAL NUMERICAL FORECASTS: SURVEY AND VERIFICATION OVER THE PERIOD 1978-1983 [OPERATIONELE NUMERIEKE VOORSPELLINGEN: OVERZICHT EN VERIFIKATIE OVER DE PERIODE 1978-1983]
H. Timmerman, L. C. Heijboer, and A. vanderHoek 1984 29 p refs In DUTCH; ENGLISH summary
(KNMI-TR-49) Avail: NTIS HC A03/MF A01

The numerical operational model of the Royal Dutch Meteorological Institute (KNMI) in the years 1978-1983 is surveyed. The verification deals with the pressure and the pressure gradient which are very important components in the computation of the wind. Observed winds at the light vessel Goeree were compared with computed winds of the KNMI-model. Tidal observations of Hoek van Holland were verified against computed values of the KNMI storm surge model. Some important conclusions can be drawn. For the first 12 hours forecast - with respect to the pressure gradient - the difference between the KNMI filtered model and the advanced models based on primitive equations is small. For a forecast period up to 24 hours, there are no significant differences between a simple two-parameter filtered model and a filtered four-layer model. With respect to the tidal computations the relatively large difference between observed tidal heights and tidal heights compared by means of analyzed pressure fields is striking. Apparently this difference provides, on the average, the most important contribution to the difference between the tidal observations and the computed tidal values, at least for the first 12 hours of forecast. Author (ESA)

N85-13436# North Central Forest Experiment Station, St. Paul, Minn.
HOMOGENEOUS MACROCLIMATIC ZONES OF THE LAKE STATES
H. M. Rauscher Jul. 1984 44 p refs
(PB84-215821; FSRP-NC-240) Avail: NTIS HC A03/MF A01 CSCL 04B

The macroclimate of the Lake States is summarized and described by mapped homoclimatic zones. Cluster analysis in conjunction with principal components analysis were used to derive the homoclimatic zones. Each homoclimatic zone is qualitatively and quantitatively compared to all the others. GRA

N85-13437# Desert Research Inst., Reno, Nev. Atmospheric Sciences Center.
DEVELOPMENT AND EVALUATION OF CLOUD WATER COLLECTORS Final Report
Ulrich Katz and David F. Miller Apr. 1984 114 p refs Sponsored in part by EPRI and Coordinating Research Council, Inc.
(PB84-232529) Avail: NTIS HC A06/MF A01 CSCL 04B

Two varieties of impactor-type samplers were designed and constructed to specifically collect cloud water samples for chemical characterization. Design features included a sharp drop-size cut-off, high collection efficiency, minimal contact area and protection against contamination and evaporation. After preliminary testing, the more accomplished cloud water collector was deployed to Whiteface Mountain, New York. Cloud water samples were chemically analyzed. Eleven cloud events covering a period of 140 hours between June 29 and August 9 were sampled by both groups of investigators. Because sampling intervals did not coincide, the chemical composition of cloud samples from the two collectors was compared using time-weighted averages computed for 30-minute intervals. GRA

N85-13438# Environmental Sciences Research Lab., Research Triangle Park, N.C.
SPATIAL AND TEMPORAL INTERPOLATION OF NEROS RADIOSONDE WINDS Final Report
O. R. Bullock, Jr. Aug. 1984 93 p refs
(PB84-232545; EPA-600/3-84-086) Avail: NTIS HC A05/MF A01 CSCL 04B

This research program was initiated with the overall objective of determining a most appropriate numerical method for the spatial and temporal analysis of free atmospheric, radiosonde derived, wind observations for the NEROS pollutant transport model. The analysis was to be performed by automated data processing under certain restrictions in computation time and storage area. Previously developed methods of spatial and temporal data analysis were reviewed and their applicability to the NEROS effort were evaluated. Evaluation was based on tests with actual radiosonde data and with data sets produced through numerical model initialization procedures. In all cases, the desired result was a 7 by 6 grid of wind vectors in latitude longitude space, for every hour during a three day test period. Author (GRA)

N85-13439# Environmental Protection Agency, Boston, Mass.
CALMS PROCESSOR (CALMPRO) USER'S GUIDE Final Report
M. Y. Perkins and S. S. Perkins Jun. 1984 45 p refs
(PB84-229467; EPA-901/9-84-001; EPA/DF-84/053A) Avail: NTIS HC A03/MF A01 CSCL 04B

The calms processor (CALMPRO) is a computer program that eliminates the influence of calms on pollutant concentrations calculated by air quality dispersion models. The procedure disregards concentrations for hours when the winds are calm. The hour is treated as missing and a convention for handling missing hours is employed. CALMPRO produces statistics on the occurrence of calms in the meteorological data set and recalculates average concentrations for 1-hour, 3-hour, 8-hour, and annual time intervals. Technical details on the processor are presented with complete descriptions of data requirements and output. An example application of CALMPRO and the source program lasting are included as appendices. GRA

N85-13440# National Oceanic and Atmospheric Administration, Boulder, Colo. Environmental Research Labs.
WEATHER RESEARCH PROGRAM REPORT; FY 1983 Annual Report
Jan. 1984 31 p refs
(PB84-236694; NOAA-84082004) Avail: NTIS HC A03/MF A01 CSCL 04B

The Weather Research Program (WRP), previously a part of the Office of Weather Research and Modification (OWRM), conducts research to increase the understanding and improve the prediction of mesoscale weather systems. The research emphasis is on the genesis, evolution, and structure of convectively driven systems; the scale of interest extends from individual thunderstorms to large mesoscale precipitation systems. GRA

N85-13441# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Natural Disasters.
HURRICANE ALICIA, GALVESTON AND HOUSTON, TEXAS, 17-18 AUGUST 1983
1984 169 p refs
(Grant NSF CEE-82-19358)
(PB84-237056; CETS-CND-028) Avail: NTIS HC A08/MF A01 CSCL 04B

Hurricane Alicia, which came ashore near Galveston, Texas, during the night of August 17-18, 1983, was the first tropical cyclone of full hurricane intensity to strike the U.S. mainland in over three years. It will be recorded as the second most costly storm ever to strike the United States, if Hurricane Agnes, which in 1972 caused inland flooding over a large part of the U.S. East Coast, is excluded. Alicia's coastal property damage was exceeded only by that of Hurricane Frederic, which came ashore near Mobile, Alabama, in 1979. The purposes of this report are to document the storm's characteristics and effects, to call attention to specific characteristics, effects, and storm-related conditions that could be studied further with beneficial results, and to examine the warning, responses, and recovery occasioned by the storm. GRA

N85-13442# National Weather Service, Garden City, N.Y.
WXR (HYDROLOGIC WEATHER WIRE AND PLT PRODUCT SOFTWARE PACKAGE)
H. Opitz Aug. 1984 63 p refs
(PB84-237221; NOAA-NWS-ERCP-24; NOAA-84082001) Avail: NTIS HC A04/MF A01 CSCL 04B

WXR is a hydrologic weather wire and PLT product software package which manipulates decoded SHEF hydrologic data according to runtime command line options. WXR coordinates execution with various master format parameter files. The master format parameter files contain the actual output format for specific weather wire products and are assembled during an initial setup phase. Multiple master files may be assembled for various output formats. The operator decides, via command line input, which file(s) WXR will use. WXR will also create, at the operator's option, a hydrologic PLT product. The PMOD package can then be used to transform this into a graphic. Author (GRA)

N85-13443# National Center for Atmospheric Research, Boulder, Colo. National Scientific Balloon Facility.
FEASIBILITY OF LONG DURATION BALLOONING IN ANTARCTICA
D. Ball Jul. 1984 20 p refs Sponsored in part by NSF
(PB84-240571; NCAR/TN-239-PPR) Avail: NTIS HC A02/MF A01 CSCL 04B

A plan for balloon operations in Antarctica for atmospheric research is outlined. The logistical, atmospheric, and electronics support problems associated with a proposed balloon campaign in the Antarctic are discussed. It appears that it is feasible to achieve long duration balloon flights from the South Pole. GRA

N85-13444# National Center for Atmospheric Research, Boulder, Colo. Advanced Study Program.
COMPARISON OF WIND DERIVED FROM THE LIMS (LIMB INFRARED MONITOR OF THE STRATOSPHERE) SATELLITE INSTRUMENT WITH ROCKET OBSERVATIONS
A. K. Smith Jun. 1984 86 p refs Sponsored in part by NSF
(Contract NASA Order W-15439)
(NASA-CR-174083; NAS 1.26:174083; PB84-240589; NCAR/TN-235-STR) Avail: NTIS HC A05/MF A01 CSCL 04B

The accuracy of winds derived from daily mapped fields of data from the Limb Infrared Monitor of the Stratosphere (LIMS) were evaluated. Two matters are considered: (1) the determination of the best of several algorithms for computing horizontal winds from the LIMS data; and (2) the evaluation of the computed LIMS winds compared with in situ rocket measurements. The data sets used in the comparisons and the methods used for computing zonal and meridonal winds from the LIMS data, and a few individual profiles which illustrate the different methods are outlined, which are used to subjectively select the best method for determining horizontal winds. GRA

N85-13341# Granada Univ. (Spain). Dept. Fisica Fundamental.
RADIATION TRANSPORT IN THE EARTH ATMOSPHERE [EL TRANSPORTE RADIATIVO EN LA ATMOSFERA TERRESTRE]
E. Battaner and J. M. Quintana *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 411-417 refs In SPANISH (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13343# Centre National de la Recherche Scientifique, Verrieres-le-Buisson (France). Service d'Aeronomie.
WAVE PHASE VELOCITY IN A WIND GRADIENT [LA VELOCIDAD DE FASE DE UNA ONDA EN UN GRADIENTE DE VIENTO]
H. Teitelbaum *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 429-436 refs In SPANISH (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13344# National Inst. of Meteorology, Madrid (Spain). Centro de Estudios Meteorologicas.
DISTRIBUTION OF TOTAL SOLAR RADIATION IN SPAIN [DISTRIBUCION DE LA IRRADIATION SOLAR GLOBAL EN ESPANA]
L. Sanchez Muiniosguren and P. dePabloRicote *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 437-446 refs In SPANISH (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N85-13445*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
OCEAN SERVICES USER NEEDS ASSESSMENT. VOLUME 1:

SURVEY RESULTS, CONCLUSIONS AND RECOMMENDATIONS Final Report
Donald R. Montgomery, Randall J. Patton (Dynamics Technology, Inc.), and Samual W. McCandless (User Systems, Inc.) 5 Apr. 1984 141 p Sponsored in part by NOAA
(Contract NAS7-918)
(NASA-CR-174104; JPL-PUB-84-19; NAS 1.26:174104) Avail: NTIS HC A07/MF A01 CSCL 08J

An interpretation of environmental information needs of marine users, derived from a direct contact survey of eight important sectors of the marine user community is presented. Findings of the survey and results and recommendations are reported. The findings consist of specific and quantized measurement and derived product needs for each sector and comparisons of these needs with current and planned NOAA data and services. The following supportive and reference material are examined: direct contact interviews with industry members, analyses of current NOAA data gathering and derived product capabilities, evaluations of new and emerging domestic and foreign satellite data gathering capabilities, and a special commercial fishing survey conducted by the Jet Propulsion Laboratory (JPL). E.A.K.

N85-13446*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MULTISENSOR SATELLITE DATA INTEGRATION FOR SEA SURFACE WIND SPEED AND DIRECTION DETERMINATION Final Report
David L. Glackin, Gregory G. Pihos, and Sherry L. Wheelock 30 Mar. 1984 80 p refs Sponsored in part by the Department of the Navy
(Contract NAS7-918)
(NASA-CR-174162; NAS 1.26:174162) Avail: NTIS HC A05/MF A01 CSCL 08J

Techniques to integrate meteorological data from various satellite sensors to yield a global measure of sea surface wind speed and direction for input to the Navy's operational weather forecast models were investigated. The sensors were launched or will be launched, specifically the GOES visible and infrared imaging sensor, the Nimbus-7 SMMR, and the DMSP SSM/I instrument. An algorithm for the extrapolation to the sea surface of wind directions as derived from successive GOES cloud images was developed. This wind veering algorithm is relatively simple, accounts for the major physical variables, and seems to represent the best solution that can be found with existing data. An algorithm for the interpolation of the scattered observed data to a common geographical grid was implemented. The algorithm is based on a combination of inverse distance weighting and trend surface fitting, and is suited to combing wind data from disparate sources. E.A.K.

N85-13447*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
COASTAL ZONE COLOR SCANNER (CZCS): IMAGERY OF NEAR-SURFACE PHYTOPLANKTON PIGMENT CONCENTRATIONS FROM THE FIRST COASTAL OCEAN DYNAMICS EXPERIMENT (CODE-1), MARCH - JULY 1981
Mark R. Abbott and Philip M. Zion 1 Aug. 1984 81 p refs
(Contract NAS7-918)
(NASA-CR-174169; JPL-Pub-84-42; NAS 1.26:174169) Avail: NTIS HC A05/MF A01 CSCL 08A

As part of the first Coastal Ocean Dynamics Experiment, images of ocean color were collected from late March until late July, 1981, by the Coastal Zone Color Scanner aboard Nimbus-7. Images that had sufficient cloud-free area to be of interest were processed to yield near-surface phytoplankton pigment concentrations. These images were then remapped to a fixed equal-area grid. This report contains photographs of the digital images and a brief description of the processing methods. Author

N85-13448*# Florida State Univ., Tallahassee. Mesoscale Air-Sea Interaction Group.
DYNAMICS OF COUPLED ICE-OCEAN SYSTEM IN THE MARGINAL ICE ZONE: STUDY OF THE MESOSCALE PROCESSES AND OF CONSTITUTIVE EQUATIONS FOR SEA ICE
Sirpa Hakkinen Dec. 1984 103 p refs
(Grant NAG5-219; Contract N00014-82-C-0404)
(NASA-CR-174171; NAS 1.26:174171) Avail: NTIS HC A06/MF A01 CSCL 08L

This study is aimed at the modelling of mesoscale processed such as up/downwelling and ice edge eddies in the marginal ice zones. A 2-dimensional coupled ice-ocean model is used for the study. The ice model is coupled to the reduced gravity ocean model (f-plane) through interfacial stresses. The constitutive equations of the sea ice are formulated on the basis of the Reiner-Rivlin theory. The internal ice stresses are important only at high ice concentrations (90-100%), otherwise the ice motion is essentially free drift, where the air-ice stress is balanced by the ice-water stress. The model was tested by studying the upwelling dynamics. Winds parallel to the ice edge with the ice on the right produce upwilling because the air-ice momentum flux is much greater that air-ocean momentum flux, and thus the Ekman transport is bigger under the ice than in the open water. The upwelling simulation was extended to include temporally varying forcing, which was chosen to vary sinusoidally with a 4 day period. This forcing resembles successive cyclone passings. In the model with a thin oceanic upper layer, ice bands were formed. Author

N85-13449# National Oceanographic Data Center, Washington, D. C.
NODC/1983: NATIONAL OCEANOGRAPHIC DATA CENTER REPORT Annual Report
Jun. 1984 31 p refs
(PB84-222231; NOAA-84071107) Avail: NTIS HC A03/MF A01 CSCL 08J

Contents: Improving ocean services, data files, products and services; programs and projects; data systems developments; international activities; organizational affairs; and review, 1984. GRA

N85-13450# Alaska Univ., Fairbanks. Geophysical Inst.
ARCTIC ICE ISLAND AND SEA ICE MOVEMENTS AND MECHANICAL PROPERTIES Quarterly Report, 1 Jan. - 31 Mar. 1984
W. M. Sackinger, W. J. Stringer, and H. Serson 1984 189 p refs
(Contract DE-AC21-83MC-20037)
(DE84-016323; DOE/MC-20037/1644; QR-2) Avail: NTIS HC A09/MF A01

Research activities are presented for the following tasks: (1) ice island; (2) Chukchi Sea pack ice age; and (3) mechanical properties of sea spray ice bonds structures. The research program on ice islands has four objectives: (1) establish a time history of all of the Arctic ice shelves and an historically verified source function for ice islands through the use of aerial photography, satellite buoys on the existing ice islands to track their trajectories daily and to telemeter daily barometric pressure and temperature, via system Argos; (3) relate geostrophic winds to the observed trajectories; and (4) build a pseudo random model for ice island motion over the long term which will enable a determination of the probability of interaction ice islands and offshore structures. DOE

N85-13451# National Ocean Survey, Rockville, Md.
TIDE TABLES 1985, HIGH AND LOW WATER PREDICTIONS, CENTRAL AND WESTERN PACIFIC OCEAN AND INDIAN OCEAN
1984 393 p refs
(PB84-238393; NOAA-84082202) Avail: NTIS HC A17/MF A01 CSCL 08C

The report contains full daily predictions for 74 reference stations and differences and other constants for about 1,900 stations. It also contains a table for obtaining the approximate height of the tide at any time, a table of local mean time of sunrise and sunset for every 5th day of the year for different latitudes, a table for the reduction of local mean time to standard time, a table for converting feet to meters, a table of the Greenwich man time of the Moon's phases, apogee, perigee, greatest north and south and zero declination, and the time of the solar equinoxes and solstices, and a glossary of terms. GRA

N85-13452# National Oceanic and Atmospheric Administration, Seattle, Wash. Pacific Marine Environmental Lab.
RECENT OBSERVATIONS OF TIDES AND TIDAL CURRENTS FROM THE NORTHEASTERN BERING SEA SHELF
H. O. Mofjeld Jun. 1982 42 p refs
(PB84-241785; NOAA-TM-ERL-PMEL-57; NOAA-84082401) Avail: NTIS HC A03/MF A01 CSCL 08C

Tide and tidal current observations from the Northeastern Bering Sea Shelf and a comparison of these observations with theory and numerical models are reported in this memorandum. Pressure observations (November 1981 -August 1982) at seven stations show that the diurnal tides dominate the outer shelf. The diurnal amplitudes (maximum of 38 cm for K1 and 26 cm for 01 at the shelfbreak) decrease exponentially inshore from the shelfbreak at a rate consistent with subinertial Sverdrup waves. The phase lags of the diurnal tides vary little (ranging from 322 degrees G to 359 degrees G for the K1 tide) over the shelf. The semidiurnal amplitudes (maximum of 23 cm for M2 at the shelfbreak) change considerably between stations; on the outer shelf there is some influence of a semidiurnal amphidromic system off Cape Navarin. Author (GRA)

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N85-13453# Joint Publications Research Service, Arlington, Va.
USSR REPORT: LIFE SCIENCES. BIOMEDICAL AND BEHAVIORAL SCIENCES
21 Nov. 1984 141 p Transl. into ENGLISH from various Russian articles
(JPRS-UBB-84-025) Avail: NTIS HC A07

Research in biomedical and behavioral sciences is reported. Some general topics include aerospace medicine, agrotechnology, bionics, biophysics, epidemiology, genetics, human factors engineering, immunology, laser effects and nonionizing electromagnetic radiation effects. Much of the research deals with radiation biology with articles on radiation impairment of RNA metabolism in interphase death of lymphoid cells, improving effectiveness of irradiation for Lewis' carcinoma in mice with adeturon and parametric analysis of periods of death in irradiated animal. For individual titles, see N85-13454 through N85-13456.

N85-13454# Joint Publications Research Service, Arlington, Va.
CLIMATE-CHAMBER EXPERIMENTS TO IMPROVE PILOTS' WORK CONDITIONS Abstract Only **c54**
In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-025) 21 Nov. 1984 p 1 Transl. into ENGLISH from Vozdushniy Transport (Moscow), 2 Aug. 1984 p 3 (For primary document see N85-13453 04-51)
Copyright. Avail: NTIS HC A07

An account is given of an experiment conducted for the study of civil aviation specialists' working conditions. Psychophysiological tests and experiments using microclimate chambers with modeling of actual flight conditions are given in order to study a subjects' performance of flight operations, and to monitor functional shifts occurring in their bodies in certain temperature and humidity conditions. The purpose of the experiment was to evaluate a subject's work capacity during a simulated eight hour flight. E.R.

N85-13455# Joint Publications Research Service, Arlington, Va.
MACHINE MECHANICS INSTITUTE BUILDS WALKING VEHICLE Abstract Only **c54**
In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-025) 21 Nov. 1984 p 43 Transl. into ENGLISH from Izv. (Moscow), 23 Aug. 1984 p 2 (For primary document see N85-13453 04-51)
Copyright. Avail: NTIS HC A07

A cross country vehicle which walks, rather than rolls was developed. A driver started the engine and pressed a button, and the vehicle slowly walked out of a garage and then began to stride along. Its iron legs moved up and down smoothly. The walking vehicle is controlled by only three buttons: the middle button gives the command to go straight ahead, while the left and right ones determine the directions of turns. Many advances in electronics, biomechanics, machine science and computer technology were utilized in its design. Hydraulic systems - the vehicle's muscles - are activated on command of an electronic device. The vehicle is automatically maintained in a horizontal position even when it moves over very rugged terrain. Author

N85-13456# Joint Publications Research Service, Arlington, Va.
RECH-1 SPEECH SYNTHESIZER FOR MAN-MACHINE DIALOG Abstract Only **c54**
O. Gusev *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-025) 21 Nov. 1984 p 60 Transl. into ENGLISH from Pravda (Moscow), 2 Sep. 1984 p 6 (For primary document see N85-13453 04-51)
Copyright. Avail: NTIS HC A07

An electronic device which can synthesize speech as well as comprehend it is described. The Rech'-1 is intended for spoken dialog with computers. The system reportedly is capable of functioning as an intermediate link between operators and large computers which control production processes or the automation of design work. An account is given of a dialog using the Rech'-1. The system is reported capable of responding to 200 command words and of synthesizing speech from a printed text, in both Russian and Ukrainian. To enable the device to understand spoken commands, a unit was developed which produces graphic representations of spoken words on paper. To prepare the Rech'-1 to understand his commands, an operator has to pronounce each word into a microphone only once. Each word is recorded in an on-line storage. An individual data link of sound images is thus created for each speaker. Author

N85-13457# Joint Publications Research Service, Arlington, Va.
USSR REPORT: LIFE SCIENCES: BIOMEDICAL AND BEHAVIORAL SCIENCES
5 Dec. 1984 168 p refs Transl. into ENGLISH from various Russian articles
(JPRS-UBB-84-026) Avail: NTIS HC A08

Research and progress in life sciences, biomedicine, and behavioral sciences is reported. Topics discussed include: aerospace medicine, agrotechnology, epidemiology, genetics, and physiology. For individual titles, see N85-13458 through N85-13463.

N85-13458# Joint Publications Research Service, Arlington, Va.
IMPACT OF SPACE MEDICINE ON EARTH-BASED MEDICINE: ACADEMICIAN YE. I. CHAZOV COMMENTS ON THE WORK IN ORBIT OF PHYSICIAN O. ATKOV **c52**
A. Romanov *In its* USSR Rept.: Life Sci.: Biomed. and Behavioral Sci. (JPRS-UBB-84-026) 5 Dec. 1984 p 1-2 Transl. into ENGLISH from Leningr. Pravda (Leningrad), 23 Aug. 1984 p 3 (For primary document see N85-13457 04-51)
Avail: NTIS HC A08

Medical research in space which has an appreciable impact on medicine on Earth was examined. The importance of learning the patterns of the cardiovascular system is the subject of many experiments in space. The effect of space factors to the cardiovascular system, the process of adaptation of a living organism to weightlessness, accelerations at lift-off and return of cosmonauts to Earth is discussed. E.A.K.

N85-13459# Joint Publications Research Service, Arlington, Va.
SOME PRINCIPLES OF PLANT RESOURCES EVALUATION USING REMOTELY SENSED DATA **c43**
S. M. Gorozhankina and V. D. Konstantinov *In its* USSR Rept.: Life Sci.: Biomed. and Behavioral Sci. (JPRS-UBB-84-026) 5 Dec. 1984 p 3-18 refs Transl. into ENGLISH from Rastitelnyye Resursy (Leningrad), v. 20, no. 3, 1984 p 297-307 (For primary document see N85-13457 04-51)

Avail: NTIS HC A08

The exploitation of natural resources which includes development of a scientifically based method to evaluate and calculate nonligneous forest resources is discussed. The data of forest resources inventorization are very scanty with respect to plants of the herbaceous and shrub classes of the plant kingdom. The need for an efficient study of the geography and ecology of exploitable nonligneous species, based on the principle that characteristics of their development and dispersal are intimately linked to the structure of the ground cover as biogeocenosis at all organizational levels is emphasized. The dispersal areas and the determination of reserves and the seasonal dynamics of nonligneous plant production and the characteristics of soils and the plant cover are studied. Stationary observations must be combined with consistent substantiation of data obtained extraterrestrially by use of remote sensing photography. E.A.K.

N85-13460# Joint Publications Research Service, Arlington, Va.
EFFECTIVENESS OF AGRICULTURAL AVIATION c05
V. V. Kuzkin *In its* USSR Rept.: Life Sci.: Biomed. and Behavioral Sci. (JPRS-UBB-84-026) 5 Dec. 1984 p 21-26 Transl. into ENGLISH from Zashchita Rast. (Moscow), no. 8, Aug. 1984 p 2-4 (For primary document see N85-13457 04-51)
Avail: NTIS HC A08

The growth in the volume of aviation chemical work which is accompanied by an improvement in qualitative indicators, an improvement in the productivity of flights, economize on material expenditures and the introduction of new technological methods and agricultural apparatuses was examined. Flight organization is improved and ties between aviation enterprises and soviets of agroindustrial associations, are strengthened. More progressive methods and highly productive apparatuses are more widely employed. The most important indicator of effectiveness of agricultural aviation is the use of flights, which is related to the maximum tolerated load of chemicals on the flying apparatus and indirectly related to the expenditure norm per hectare and to the duration of the flight. The increase of productivity by decreasing flight time by curtailing the hop from the airport to the designated plot is emphasized. Productivity of aircraft is affected by the configurations of fields, the agricultural equipment, technology, and the time the chemicals are loaded. E.A.K.

N85-13461# Joint Publications Research Service, Arlington, Va.
OPERATION OF AVIATION SUPPORT BASES c09
E. Kh. Gasanov *In its* USSR Rept.: Life Sci.: Biomed. and Behavioral Sci. (JPRS-UBB-84-026) 5 Dec. 1984 p 27-28 Transl. into ENGLISH from Zashchita Rast. (Moscow), no. 8, Aug. 1984 p 4 (For primary document see N85-13457 04-51)
Avail: NTIS HC A08

A progressive method of group basing of crews was introduced which allows the improvement of the effectiveness and quality of aviation chemical operation. A school of progressive experience was established. In 1965 crews from aviation enterprises treated 906,000 hectares, in 1983 the figure was over 1.5 million hectares. The fleet of airplanes increased insignificantly, this increase was caused by the increase in labor productivity. In the region serviced by the enterprise nine support bases were created. The distance between any one of them and the farthest sowing area was not more than 10 to 16 kilometers. Each base has an airport, a parking site for aircraft provision of emergency electrical energy, storehouses, production and housing facilities and a dispatcher's point with the necessary means of communication. E.A.K.

N85-13462# Joint Publications Research Service, Arlington, Va.
RESULTS OF STUDY OF HYPOXIA PROBLEMS Abstract Only c52
M. M. Seredenko *In its* USSR Rept.: Life Sci.: Biomed. and Behavioral Sci. (JPRS-UBB-84-026) 5 Dec. 1984 p 139-140 Transl. into ENGLISH from Fiziologicheskiy Zh. (Kiev), v. 30, no. 3, May - Jun. 1984 p 355-362 Original language document was announced in IAA as A84-39675 (For primary document see N85-13457 04-51)
Avail: NTIS HC A08

Hypoxic states were studied. The description of physiological properties of organisms during vital activity under conditions of a rarefied atmosphere and adaptation to mountain climate are addressed. Factors which cause mountain hypoxia and methods for its treatment are examined. The ontogenetic aspects of hypoxia and to anomalous response to hypoxia at early and late stages of ontogenesis are examined. Age related features of blood oxygenation mechanisms of the lungs are also studied. A theory is formulated on secondary tissue hypoxia as a result of the discrepancy between oxygen supply and tissue demands. E.A.K.

N85-13463# Joint Publications Research Service, Arlington, Va.
REFLECTION OF LATERIZATION OF SOUND STIMULI IN EVOKED POTENTIALS OF HUMAN BRAIN Abstract Only c52
A. Ndinga, O. P. Tairov, and G. A. Kulikov *In its* USSR Rept.: Life Sci.: Biomed. and Behavioral Sci. (JPRS-UBB-84-026) 5 Dec. 1984 p 143 Transl. into ENGLISH from Fiziol. Cheloveka (Moscow), v. 10, no. 2, Mar. - Apr. 1984 p 265-271 (For primary document see N85-13457 04-51)
Avail: NTIS HC A08

The sensory organization in conscious acts is determined by spacial relationships of sensor signal sources and the body's orientation to it. Reflections of induced potentials of the human brain in lateralization of sound images created by introducing interaural retardation between dichotically presented sound stimuli are reported. It is indicated that subjective localization of sound images in space is reflected in features of mean induced potentials in the human brain. It is found that specific binaural reactions in associative brain systems are connected to final stages of the organization of orientation reaction, such as determination of acoustical distance to the sound source. The prevalence of the central sound channel in such reactions is attributed to its key importance in the forming of such orientational reactions. E.A.K.

N85-13464# Harbor Branch Foundation, Fort Pierce, Fla.
CULTIVATION AND CONVERSION OF MARINE MACROALGAE
J. H. Ryther, T. A. DeBusk, and M. Blakeslee May 1984 88 p refs
(Contract DE-AC02-83CH-10093)
(DE84-004522; SERI/STR-231-2360) Avail: NTIS HC A03/MF A01

The development of an alternative ocean energy farm concept that would not be dependent upon deep ocean water or other extraneous sources for its nutrient supply and that could be located in shallow, near shore, and protected coastal ocean areas was studied. Five tasks are reported: determination of the annual yield of Ulva in non-intensive cultures; evaluation of the effect of carbon concentration on Gracilaria and Ulva yields; evaluation of spray/mist culture of Ulva and Gracilaria; species screening for the production of petroleum replacement products; and synthesis analysis, and economic energy evaluation of culture data. For a land-based energy production system utilizing saline waters from underground aquifers or enclosed coastal areas, research was performed to evaluate growth and biomass production of all macroscopic algal species that could be obtained in adequate quantity in the central Florida area. DOE

N85-13465# Brookhaven National Lab., Upton, N. Y. Dept. of Applied Science.
FIELD/CELL INTERACTION MODEL
Eugene Findl 1984 6 p refs Presented at the IEEE/Engineering in Medicine and Biology Society Meeting, Los Angeles, 15-16 Sep. 1984
(Contract DE-AC02-76CH-00016)
(DE84-011914; BNL-34729; CONF-840966-1) Avail: NTIS HC A02/MF A01

Low energy level stimuli ranging from electric fields, radio frequency fields, magnetic fields to mechanical vibration, were used to elicit responses from living cells. Each of these stimuli may act on cells by different mechanisms. It is quite probable, however, that the mechanisms are similar since the effects are similar regardless of the type of stimuli. Three approaches to explaining the mechanism(s) of cell/stimuli interaction are presented that lead

to a comprehensive model to tie together all of the approaches.
DOE

N85-13466# European Space Agency, Paris (France).
A SURVEY OF SPACE BIOLOGY AND SPACE MEDICINE
H. Planel (Universite Paul Sabatier, Toulouse) and H. Oser Feb. 1984 29 p refs
(ESA-BR-17; ISSN-0250-1589) Avail: NTIS HC A03/MF A01

The effects of weightlessness on the cardiovascular system, vestibular system, and locomotor apparatus are summarized. Morphological, theoretical, and experimental aspects of the influence of weightlessness at cellular level are discussed. Philogenic and ontogenic effects of weightlessness and the influence of gravity on plants are reviewed. The hazards and biological effects of cosmic radiation, and the synergism of space radiation and weightlessness are outlined. Exobiology is mentioned.
Author (ESA)

52 AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness.

N85-13467* National Aeronautics and Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY, A CONTINUING BIBLIOGRAPHY WITH INDEXES
Dec. 1984 68 p
(NASA-SP-7011(265); NAS 1.21:7011(265)) Avail: NTIS HC $7.00 CSCL 06E

This bibliography lists 197 reports, articles and other documents introduced into the NASA scientific and technical information system in November 1984.
E.A.K.

N85-13468*# Maryland Univ., College Park. Dept. of Neurology.
MODULATION OF THE CYTOSOLIC ANDROGEN RECEPTOR IN STRIATED MUSCLE BY SEX STEROIDS
Naoimi E. Rance and Stephen E. Max [1982] 20 p refs
(Grant NAG2-100)
(NASA-CR-174173; NAS 1.26:174173) Avail: NTIS HC A02/MF A01 CSCL 06P

The influence of orchiectomy (GDX) and steroid administration on the level of the cytosolic androgen receptor in the rat levator ani muscle and in rat skeletal muscles (tibialis anterior and extensor digitorum longus) was studied. Androgen receptor binding to muscle cytosol was measured using [H-3] methyltrienolone (R1881) as ligand, 100 fold molar excess unlabeled R1881 to assess nonspecific binding, and 500 fold molar excess of triamcinolone acetonide to prevent binding to glucocorticoid and progestin receptors. Results demonstrate that modification of the levels of sex steroids can alter the content of androgen receptors of rat striated muscle. Data suggest that: (1) cytosolic androgen receptor levels increase after orchiectomy in both levator ani muscle and skeletal muscle; (2) the acute increase in receptor levels is blocked by an inhibitor of protein synthesis; and (3) administration of estradiol-17 beta to castrated animals increases receptor binding in levator ani muscle but not in skeletal muscle.
R.S.F.

N85-13469*# George Washington Univ., Washington, D.C. Science Communication Studies.
SPACE MEDICINE RESEARCH PUBLICATIONS: 1983-1984 Final Report
Judy L. Solberg and Linda G. Pleasant Washington NASA Dec. 1984 71 p
(Contract NASw-3165)
(NASA-CR-3860; NAS 1.26:3860) Avail: NTIS HC A04/MF A01 CSCL 06E

A list of publications supported by the Space Medicine Program, Office of Space Science and Applications is given. Included are publications entered into the Life Sciences Bibliographic Database by The George Washington University as of October 1, 1984.
R.J.F.

N85-13470# Brookhaven National Lab., Upton, N. Y.
NON-INVASIVE TECHNIQUES FOR DETERMINING MUSCULO-SKELETON BODY COMPOSITION
S. H. Cohn 1984 9 p refs Presented at Workshop on Advan. in NASA-Relevant Minimally Invasive Instr., Pacific Grove, Calif., 25 Apr. 1984
(Contract DE-AC02-76CH-00016)
(DE84-015718; BNL-35046; CONF-8404180-1) Avail: NTIS HC A02/MF A01

In vivo neutron activation analysis, combined with gamma spectrometry, has ushered in a new era of clinical diagnosis and evaluation of therapies, as well as investigation into and modelling of body composition in both normal individuals and patients suffering from various diseases and dysfunctions. Body composition studies have provided baseline data on such vital constituents as nitrogen, potassium and calcium. The non-invasive measurement techniques are particularly suitable for study of the musculo-skeletal changes in body composition. Of particular relevance here is the measurement of calciums loss in astronauts during prolonged space flights.
DOE

N85-13471# Research Inst. of National Defence, Stockholm (Sweden). Dept. 5.
EXPERIMENTS WITH HYDROX AT 1.3 MPa (13 ATM)
Hans Oernhagen Jun. 1984 131 p refs In SWEDISH; ENGLISH summary
(FOA-C-58014-H1; ISSN-0347-7665) Avail: NTIS HC A07/MF A01

During a heliox saturation to 1.3 MPa, 3 divers were exposed on mask to hydrox (98% hydrogen, 2% oxygen) for periods up to 60 min. Depth narcosis, pulmonary mechanics, physical working capacities, isobaric gas supersaturation, and blood chemistry were studied. Results produce no evidence that hydrogen has a harmful influence. Compared with helium, respiration performances are better with hydrogen because of its low density. Hydrogen has an obvious narcotics effect and cannot be used undiluted at depths below 200 m.
Author (ESA)

N85-13472# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
HUMAN REACTIONS TO ELF (EXTREMELY LOW FREQUENCY) ELECTRIC AND MAGNETIC FIELDS. AN ANNOTATED BIBLIOGRAPHY OF CURRENT LITERATURE, FOURTH EDITION Final Report
J. P. Reilly Jun. 1984 118 p Sponsored by Maryland Department of Natural Resources
(PB84-230358; PPSP/JHU/PPSE-T-30) Avail: NTIS HC A06/MF A01 CSCL 06F

The annotated bibliography lists current literature (since 1960) which applied to human reactions to electric and magnetic fields from 10 Hz to 100 Hz, with an emphasis on power frequency fields. This includes direct experimental work with humans, epidemiological studies, works which use animal studies to draw interferences about human reactions, studies concerning human dosimetry, and works which discuss means for human protection. This bibliography was first published in July 1981. The fourth edition includes material obtained through June 1984.
Author (GRA)

N85-13458# Joint Publications Research Service, Arlington, Va.
IMPACT OF SPACE MEDICINE ON EARTH-BASED MEDICINE: ACADEMICIAN YE. I. CHAZOV COMMENTS ON THE WORK IN ORBIT OF PHYSICIAN O. ATKOV
A. Romanov *In its* USSR Rept.: Life Sci.: Biomed. and Behavioral Sci. (JPRS-UBB-84-026) 5 Dec. 1984 p 1-2 Transl. into ENGLISH from Leningr. Pravda (Leningrad), 23 Aug. 1984 p 3 (For primary document see N85-13457 04-51)
Avail: NTIS HC A08

N85-13462# Joint Publications Research Service, Arlington, Va.
RESULTS OF STUDY OF HYPOXIA PROBLEMS Abstract Only

M. M. Seredenko *In its* USSR Rept.: Life Sci.: Biomed. and Behavioral Sci. (JPRS-UBB-84-026) 5 Dec. 1984 p 139-140 Transl. into ENGLISH from Fiziologicheskiy Zh. (Kiev), v. 30, no. 3, May - Jun. 1984 p 355-362 Original language document was announced in IAA as A84-39675 (For primary document see N85-13457 04-51)
Avail: NTIS HC A08

N85-13463# Joint Publications Research Service, Arlington, Va.
REFLECTION OF LATERIZATION OF SOUND STIMULI IN EVOKED POTENTIALS OF HUMAN BRAIN Abstract Only
A. Ndinga, O. P. Tairov, and G. A. Kulikov *In its* USSR Rept.: Life Sci.: Biomed. and Behavioral Sci. (JPRS-UBB-84-026) 5 Dec. 1984 p 143 Transl. into ENGLISH from Fiziol. Cheloveka (Moscow), v. 10, no. 2, Mar. - Apr. 1984 p 265-271 (For primary document see N85-13457 04-51)
Avail: NTIS HC A08

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N85-13080# Hokkaido Univ., Sapporo (Japan).
A MATHEMATICAL MODEL OF VISUAL PERCEPTION REGARDING PERIPHERAL VISION AND ITS APPLICATION TO THE HERMANN'S ILLUSION
Takamasa Oyama, Takahiro Yamanoi, Toshimasa Yamazaki, and Michiaki Kawaguchi *In its* Bull. of the Fac. of Eng., Hokkaido Univ., No. 123 Oct. 1984 p 67-76 refs In JAPANESE; ENGLISH summary (For primary document see N85-13075 04-31)
Avail: NTIS HC A05/MF A01

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N85-13473*# McDonnell-Douglas Astronautics Co., Huntington Beach, Calif.
THE HUMAN ROLE IN SPACE. VOLUME 1: EXECUTIVE SUMMARY Final Report
Oct. 1984 27 p 3 Vol.
(Contract NAS8-35611)
(NASA-CR-171223; NAS 1.26:171223; MDC-H1295-Vol-1; DR-4-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 05H

The role and degree of direct involvement of humans required in future space missions were investigated. Criteria for allocating functional activities between humans and machines were established. The technology requirements, economics, and benefits of the human presence in space were investigated. R.S.F.

N85-13474*# McDonnell-Douglas Astronautics Co., Huntington Beach, Calif.
THE HUMAN ROLE IN SPACE. VOLUME 2: RESEARCH ANALYSIS AND TECHNOLOGY REPORT Final Report
Oct. 1984 320 p refs 3 Vol.
(Contract NAS8-35611)
(NASA-CR-171224; NAS 1.26:171224; MDC-H1295-Vol-2; DR-4-Vol-2) Avail: NTIS HC A14/MF A01 CSCL 05H

The human role in space was studied. The role and the degree of direct involvement of humans that will be required in future space missions are investigated. Valid criteria for allocating functional activities between humans and machines were established. The technology requirements, economics, and benefits of the human presence in space was examined. Topics discussed include: human qualifications for space activities; specific project assessments; technology requirements and tasks; and generalization on human roles in space. E.A.K.

N85-13475*# McDonnell-Douglas Astronautics Co., Huntington Beach, Calif.
THE HUMAN ROLE IN SPACE. VOLUME 3: GENERALIZATIONS ON HUMAN ROLES IN SPACE Final Report, Oct. 1983 - Sep. 1984
Oct. 1984 66 p 3 Vol.
(Contract NAS8-35611)
(NASA-CR-171225; NAS 1.26:171225; MDC-H1295-Vol-3; DR-4-Vol-3) Avail: NTIS HC A04/MF A01 CSCL 05H

The human role in space was studied. The role and the degree of direct involvement of humans that will be required in future space missions, was investigated. Valid criteria for allocating functional activities between humans and machines were established. The technology requirements, ecnomics, and benefits of the human presence in space were examined. Factors which affect crew productivity include: internal architecture; crew support; crew activities; LVA systems; IVA/EVA interfaces; and remote systems management. The accomplished work is reported and the data and analyses from which the study results are derived are included. The results provide information and guidelines to enable NASA program managers and decision makers to establish, early in the design process, the most cost effective design approach for future space programs, through the optimal application of unique human skills and capabilities in space. E.A.K.

N85-13476# General Physics Corp., Columbia, Md.
HUMAN RELIABILITY DATA BANK: FEASIBILITY STUDY
Kay Comer, Dwight P. Miller (Sandia Labs, Albuquerque, N. Mex.), and Mike Donovan (General Physics Corp., Atlanta) 1984 9 p refs Presented at the Human Factors Soc. Ann. Meeting, San Antonio, 22 Oct. 1984
(Contract DE-AC04-76DP-00789)
(DE84-015215; SAND-84-1569C; CONF-841099-2) Avail: NTIS HC A02/MF A01

The US Nuclear Regulatory Commission and Sandia National Laboratories have been developing a plan for a human reliability data bank since August 1981. This research is in response to the data needs of the nuclear power industry's probabilistic risk assessment community. The three phases of the program are to: (1) develop the data bank concept; (2) develop an implementation plan and conduct a feasibility study; and (3) assist a sponsor in implementing the data bank. The program is now in Phase 2. The methods used in the feasibility study are described. Decisions to be made in the future regarding full scale implementation will be based, in part, on the outcome of this study. DOE

N85-13454# Joint Publications Research Service, Arlington, Va.
CLIMATE-CHAMBER EXPERIMENTS TO IMPROVE PILOTS' WORK CONDITIONS Abstract Only
In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-025) 21 Nov. 1984 p 1 Transl. into ENGLISH from Vozdushniy Transport (Moscow), 2 Aug. 1984 p 3 (For primary document see N85-13453 04-51)
Copyright. Avail: NTIS HC A07

N85-13455# Joint Publications Research Service, Arlington, Va.
MACHINE MECHANICS INSTITUTE BUILDS WALKING VEHICLE Abstract Only
In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-025) 21 Nov. 1984 p 43 Transl. into ENGLISH from Izv. (Moscow), 23 Aug. 1984 p 2 (For primary document see N85-13453 04-51)
Copyright. Avail: NTIS HC A07

N85-13456# Joint Publications Research Service, Arlington, Va.
RECH-1 SPEECH SYNTHESIZER FOR MAN-MACHINE DIALOG Abstract Only
O. Gusev *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-025) 21 Nov. 1984 p 60 Transl. into ENGLISH from Pravda (Moscow), 2 Sep. 1984 p 6 (For primary

document see N85-13453 04-51)
Copyright. Avail: NTIS HC A07

55 PLANETARY BIOLOGY

Includes exobiology; and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

No abstracts in this category.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

N85-13477*# Michigan Univ., Ann Arbor. Dept. of Electrical and Computer Engineering.
ANALYSIS OF THE IMPACT OF ERROR DETECTION ON COMPUTER PERFORMANCE Progress Report
Kang C. Shin and Yann-Hang Lee Aug. 1983 24 p refs
(Grant NAG1-296)
(NASA-CR-174167; NAS 1.26:174167) Avail: NTIS HC A02/MF A01 CSCL 09B

Conventionally, reliability analyses either assume that a fault/error is detected immediately following its occurrence, or neglect damages caused by latent errors. Though unrealistic, this assumption was imposed in order to avoid the difficulty of determining the respective probabilities that a fault induces an error and the error is then detected in a random amount of time after its occurrence. As a remedy for this problem a model is proposed to analyze the impact of error detection on computer performance under moderate assumptions. Error latency, the time interval between occurrence and the moment of detection, is used to measure the effectiveness of a detection mechanism. This model is used to: (1) predict the probability of producing an unreliable result, and (2) estimate the loss of computation due to fault and/or error. Author

N85-13478*# Michigan Univ., Ann Arbor. Computing Research Lab.
A UNIFIED METHOD FOR EVALUATING REAL-TIME COMPUTER CONTROLLERS: A CASE STUDY
K. G. Shin, C. M. Krishna, and Y. H. Lee [1982] 45 p refs
(Grant NAG1-296)
(NASA-CR-174168; NAS 1.26:174168) Avail: NTIS HC A03/MF A01 CSCL 09B

A real time control system consists of a synergistic pair, that is, a controlled process and a controller computer. Performance measures for real time controller computers are defined on the basis of the nature of this synergistic pair. A case study of a typical critical controlled process is presented in the context of new performance measures that express the performance of both controlled processes and real time controllers (taken as a unit) on the basis of a single variable: controller response time. Controller response time is a function of current system state, system failure rate, electrical and/or magnetic interference, etc., and is therefore a random variable. Control overhead is expressed as a monotonically nondecreasing function of the response time and the system suffers catastrophic failure, or dynamic failure, if the response time for a control task exceeds the corresponding system hard deadline, if any. A rigorous probabilistic approach is used to estimate the performance measures. The controlled process chosen for study is an aircraft in the final stages of descent, just prior to landing. First, the performance measures for the controller are presented. Secondly, control algorithms for solving the landing problem are discussed and finally the impact of the performance measures on the problem is analyzed. M.G.

N85-13479# California Univ., Berkeley. Lawrence Berkeley Lab. Engineering and Technical Services Div.
A CONTROL SCHEME FOR MICROCOMPUTERS BEING USED IN MULTIPROCESSOR ARRAYS
J. Meng and F. Gin Jun. 1984 6 p refs Presented at the 25th Intern. Symp. on Mini and Microcomputers and their Appl., San Francisco, 5-6 Jun. 1984
(Contract DE-AC03-76SF-00098)
(DE84-014590; LBL-17607) Avail: NTIS HC A02/MF A01

In general, microcomputer central processor devices are completely controllable from memory and memory control lines. By interjecting a controlling processor between the central processor chip and its memory, and using the central processor memory ready signal for synchronization, data can be supplied to the microprocessor either from an attached memory or from the controlling processor. The controlling processor may also download codes into the microprocessor's memory to be used either as programs or as data. By manipulating restart, hold and interrupt signal lines in addition to the memory lines, total control is achieved. Such a scheme can be used to orchestrate the simultaneous application of arrays of microcomputers to single large problems or to many discrete smaller problems. The details of such connections to three commercially available devices are described and how the scheme may be used to connect such devices into a cooperating parallel array is indicated. DOE

N85-13480# General Electric Co., Schenectady, N. Y. Corporate Research and Development Dept.
MICROCOMPUTER CONTROL OF A RESIDENTIAL PHOTOVOLTAIC POWER CONDITIONING SYSTEM
Bimal K. Bose, Robert L. Steigerwald, and Paul M. Szczesny 1984 26 p refs Presented at the IEEE Industrial Applications Society Meeting, Chicago, 1 Oct. 1984
(DE84-013867; SAND-84-7145c; CONF-8410100-2) Avail: NTIS HC A03/MF A01

Microcomputer-based control of a residential photovoltaic power conditioning system is described. The microcomputer is responsible for array current feedback control, maximum power tracking control, array safe zone steering control, phase-locked reference wave synthesis, sequencing control, and some diagnostics. The control functions are implemented using Intel 8761 single-chip microcomputer-based hardware and software. The controller was tested in the laboratory with the prototype power conditioner and shows excellent performance. DOE

N85-13481# Los Alamos Scientific Lab., N. Mex.
U: THE UNIVERSAL UTILITY CONTROLLER, REVISION 1
C. Snell Jul. 1984 47 p refs
(Contract W-7405-eng-36)
(DE84-017077; LA-9701-M-Rev-1) Avail: NTIS HC A03/MF A01

A controller for running the most often-used utilities on the Ltss 7600 and Ctss Cray computers U, is described. Some utilities are run in the normal manner except that abbreviations for the utility name and certain options are allowed. Other utilities are run quite differently, with more specialized but much shorter and more convenient command sequences. Operation of these utilities is described in the manual. The controller also offers a RUN or R command, which runs any utility or program directly, just as if it were being operated from the user's terminal, and a MON command, which keeps a printed record of any messages sent by a utility or program. DOE

N85-13482# National Academy of Sciences - National Research Council, Washington, D. C. Committee on National Statistics.
COMPARABILITY AND ACCURACY OF INDUSTRY CODES IN DIFFERENT DATA SYSTEMS Final Report
May 1984 149 p refs Sponsored in part by Internal Revenue Service
(PB84-215607) Avail: NTIS HC A07/MF A01 CSCL 09B

This report explores possible improvements in the quality, comparability, and efficiency of industry coding by government agencies, which use administrative records from business establishments as an efficient alternative to the direct collection of data. As background for the study, an interagency industry Coding Working Group, set up by the Administrative Records Subcommittee of the Federal Committee on Statistical Methodology, reviewed and documented 16 major industry coding systems in 6 federal agencies. Chapters 2, 3, and 4 discuss factors affecting comparability source data, and coding procedures. The quantitative data bearing on comparability are reviewed in Ch. 5. The final chapter offers conclusions and recommendations. GRA

N85-13483# Computer Corp. of America, Cambridge, Mass.
PHYSICAL DATABASE PROCESSOR PRELIMINARY INTERFACE SPECIFICATIONS Final Report
F. A. Manola Mar. 1984 77 p refs
(Contract NB79-SBCA-0086)
(PB84-217561; CCA-83/12; NBS/GCR-84/462) Avail: NTIS HC A05/MF A01 CSCL 09B

Preliminary interfaces specifications and processing functions of the Physical Data Base Processor (PDBP) component of a DBMS component architecture developed by Computer Corporation of America for the National Bureau of Standards are described. The component architecture is intended to serve as a potential framework for the developing DBMS standards. The PDBP supports storage structure objects and operations for other components of the architecture. The report also describes tradeoffs involved in choosing various storage structures to support DBMS operations. GRA

N85-13484# Office of Software Development, Falls Church, Va. Federal Software Testing Center.
GOULD INCORPORATED, GOULD CONCEPT 32/87, COBOL RELEASE 1.4
25 Jan. 1984 27 p
(PB84-227669; OIT/FSTC-83/291) Avail: NTIS HC A03/MF A01 CSCL 09C

This FSTC Technical Report for the Gould, Incorporated, COBOL Release 1.4 running under the MPX-32 Rev. 2, Rel. 2.1A provides a consolidated summary of the results obtained from the evaluation of the subject compiler against the indexed 1-0, Levels 1 and 2, Nucleus, Level 2, Relative 1-0, Level 2, Segmentation, Level 2, Table Handling, Level 2, of the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). This technical report is made up of several sections sowing all the discrepancies found, if any. A companion report Validation Summary Report OIT/FSTC-83/290 provides information regarding the validation of the compiler as the Low-Intermediate level of Federal Standard COBOL (FIPS PUB 21-1). GRA

N85-13485# Office of Software Development, Falls Church, Va. Federal Software Testing Center.
DIGITAL EQUIPMENT CORP., VAX/750, VAX COBOL VERSION 3.0
19 Jun. 1984 16 p
(PB84-227651; OIT/FSTC-84/262) Avail: NTIS HC A02/MF A01 CSCL 09B

This FSTC Technical Report for the Digital Equipment Corp., VAX COBOL Version 3.0 running under the VAX/VMS Version 3.5 provides a consolidated summary of the results obtained from the evaluation of the subject compiler against the indexed 1-0, Levels 1 and 2 Sort/Merge, Levels 1 and 2 of the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). This technical report is made up of several sections showing all the discrepancies found, if any. A companion report Validation Summary Report OIT/FSTC-84/261 provides information regarding the validation of the compiler as the Low-Intermediate level of Federal Standard COBOL (FIPS PUB 21-1). GRA

N85-13486# Office of Software Development, Falls Church, Va. Federal Software Testing Center.
DIGITAL EQUIPMENT CORP., MICRO/PDP-11, COBOL-81 VERSION 2.2
20 Jun. 1984 19 p
(PB84-227644; OIT/FSTC-84/256) Avail: NTIS HC A02/MF A01 CSCL 09B

The FSTC Technical Report for the Digital Equipment Corp., COBOL-81 Version 1.0 provides a consolidated summary of the results obtained from the evaluation of the subject compiler against the Indexed 1-0, levels 1 and 2 of the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). This technical report is made up of several sections showing all the discrepancies found, if any. GRA

N85-13487# Office of Software Development, Falls Church, Va. Federal Software Testing Center.
PRIME COMPUTER, INC., PRIME 750, FORTRAN-77 REVISION 19.4 Validation Summary Report
5 Apr. 1984 13 p
(PB84-227628; OIT/FSTC-84/171) Avail: NTIS HC A02/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the Prime Computer, Inc., FORTRAN-77 Revision 19.4 running under the PRIMOS Revision 19.4 provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1978 FORTRAN Standard (X3.9-1978/FIPS PUB 69). The compiler was validated against the Full Level FORTRAN level of FIPS PUB 69. The VSR is made up of several sections showing all the discrepancies found, if any. These include an overview of the validation which lists all categories of discrepancies within X3.9-1978, and a detailed listing of discrepancies together with the tests which failed. GRA

N85-13488# Office of Software Development, Falls Church, Va. Federal Software Testing Center.
C3, INCORPORATED, C50 SYSTEM, C3 COBOL/75 VERSION 2.00 Validation Summary Report
19 Mar. 1984 74 p
(PB84-228006; OIT/FSTC-84/200) Avail: NTIS HC A04/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the C3, Incorporated, C3 COBOL/75 Version 2.00 running under the Perkin-Elmer OS/32 Ver. 6.2 provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated against the High level of FIPS PUB 21-1. The VSR is made up of several sections showing all the discrepancies found, if any. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed. GRA

N85-13489# General Accounting Office, Washington, D. C. General Government Div.
COMPARATIVE REVIEW OF SINGLE-LINE AND MULTILINE OPTICAL CHARACTER READERS USED IN MAIL PROCESSING
7 Aug. 1984 29 p refs
(PB84-234624; GAO/GGD-84-78; B-215132) Avail: NTIS HC A03/MF A01 CSCL 09B

In a program to automate mail processing, the U.S. Postal Service is buying single-line read optical character readers. The Service decided against buying multiline optical character readers, a more advanced technology, primarily because of cost considerations. A switch to multiline optical character readers at this time would mean a possible 3- or 4-year delay of further Service automation and could result in a loss of savings. GAO found that each of the two readers has advantages over the other, but the key to which one the Postal Service should buy is the eventual level of mailer use of the nine-digit ZIP Code(ZIP + 4). The extent of ZIP + 4 usage that will develop is still uncertain. GRA

N85-13490# Urban Mass Transportation Administration, Washington, D.C. Methods Div.
MICROCOMPUTERS IN TRANSPORTATION: SOFTWARE AND SOURCE BOOK
Mar. 1984 185 p refs
(PB84-230366; UMTA-URT-41-84-1) Avail: NTIS HC A09/MF A01 CSCL 13B

Information pertaining to: (1) Microcomputer references and training; and (2) descriptions of software in the areas of transit operations, transportation planning, traffic engineering, and paratransit planning and operations is given. Topics include air quality, network based highway planning, traffic data management, and maintenance. GRA

N85-13092# Joint Publications Research Service, Arlington, Va.
NEW YeS 1056 UNIFIED SYSTEM COMPUTER MODEL DESCRIBED
Christoph Weber, Wolfgang Lampenscherf, and Karl-Heinz Homilius *In its* East Europe Rept.: Sci. and Technol. (JPRS-ESA-84-041) 20 Nov. 1984 p 34-40 refs Transl. into ENGLISH from Rechentech./Datenverarb. (East Berlin), v. 21, no. 8, Aug. 1984 p 5-7 (For primary document see N85-13090 04-31)
Avail: NTIS HC A05/MF A01

N85-13103# Joint Publications Research Service, Arlington, Va.
ARCHITECTURE OF ADAPTIVE SPACE-FREQUENCY-TIME SIGNAL PROCESSING SYSTEM Abstract Only
V. F. Struchev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 53 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 3, Mar. 1984 p 15-20 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13104# Joint Publications Research Service, Arlington, Va.
MICROPROCESSOR IMPLEMENTATION OF ALGORITHMS OF NONLINEAR FILTRATION Abstract Only
V. N. Kharisov, Yu. N. Kirilenko, M. I. Maklyukov, and A. I. Fedorov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 54 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 3, Mar. 1984 p 20-24 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13105# Joint Publications Research Service, Arlington, Va.
REVISION OF SIGNAL AND INTERFERENCE SPACE-TIME PROCESSING ALGORITHMS FOR IMPLEMENTATION BY MICROPROCESSORS Abstract Only
Ye. I. Glushankov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 54-55 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 3, Mar. 1984 p 48-51 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13106# Joint Publications Research Service, Arlington, Va.
EFFICIENCY OF COMPUTER SYSTEM DIGITAL PROCESSING OF SIGNALS Abstract Only
V. F. Struchev and V. P. Lvshin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 55-56 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 3, Mar. 1984 p 52-55 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N85-13491*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
DOCUMENTATION FOR THE MACHINE-READABLE VERSION OF THE MK CLASSIFICATION EXTENSION CATALOGUE MORRIS-KENNEDY (1983)
Wayne H. Warren, Jr. Oct. 1983 16 p refs
(NASA-TM-87372; NAS 1.15:87372) Avail: NTIS HC A02/MF A01 CSCL 09B

Detailed descriptions of the contents and formats of the data and reference files of the machine-readable catalog are provided. The catalog contains MK classifications published in the literature since the issuance of the La Plata catalog of C. Jaschek et al., (1964). The bibliographical references are also given. Author

N85-13492*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
DOCUMENTATION FOR THE MACHINE-READABLE VERSION OF THE PERTH 75: A CATALOGUE OF POSITIONS OF 2589 FK4 AND FK4S STARS (NIKOLOFF AND HOG 1982)
Wayne H. Warren, Jr. Feb. 1984 14 p refs
(NASA-TM-87376; NSSDC/WDC-A-R/S-84-03; NAS 1.15:87376) Avail: NTIS HC A02/MF A01 CSCL 09B

Detailed descriptions of the data and format of the machine-readable astronomical catalog are given. The machine version is identical in data content to the published edition, but minor modifications in the data format were made in order to effect uniformity with machine versions of other astronomical catalogs. Stellar motions and positions at epoch and equinox 1950.0 are reported. R.S.F.

N85-13493*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
DOCUMENTATION FOR THE MACHINE-READABLE VERSION OF THE AGK3 STAR CATALOGUE OF POSITIONS AND PROPER MOTIONS NORTH OF -2 DEG .5 DECLINATION (DIECKVOSS AND COLLABORATORS 1975)
Wayne H. Warren, Jr. May 1984 20 p refs
(NASA-TM-87378; NSSDC/WDC-A-R/S-84-06; NAS 1.15:87378) Avail: NTIS HC A02/MF A01 CSCL 09B

A detailed description of the machine-readable astronomical catalog as it is currently being distributed from the Astronomical Data Center is given. Stellar motions and positions are listed herein in tabular form. R.S.F.

N85-13494# Royal Signals and Radar Establishment, Malvern (England).
SOFTWARE CONFIGURATION MANAGEMENT ACROSS PROJECT BOUNDARIES AND IN DISTRIBUTED DEVELOPMENT ENVIRONMENTS
Margaret Stanley Jan. 1984 31 p refs
(RSRE-Memo-3704; BR92718) Copyright. Avail: NTIS HC A03/MF A01

The problems of software configuration management (SCM) when sharing software between projects and between host development systems, and between projects, using an integrated programming support environment (PSE) is discussed. An SCM data base and tools are outlined. For the proposed SCM schema and tools to work, access controls imposed by the data base management system must permit data base searches across project boundaries. If software development for a project is spread over a number of different host PSEs, separate SCM data bases should exist on each host. It is necessary to import and export software items to and from host PSEs. In order to control imported or exported software there should be relationships to entities representing the external host, so that tools searching for possible effects of proposed changes can indicate that other host PSEs should be considered. Author (ESA)

N85-13495# Los Alamos Scientific Lab., N. Mex.
ALGORITHM FOR SINGULAR VALUE DECOMPOSITION
D. C. Ross 1984 11 p refs Presented at the SPIE Ann. Intern. Tech. Symp. and Instrument Exhibit, San Diego, Calif., 19-24 Aug.

1984
(Contract W-7405-eng-36)
(DE84-015519; LA-UR-84-2336; CONF-840872-14) Avail: NTIS HC A02/MF A01

An iterative algorithm for the singular value decomposition (SVD) of a non-zero m x n matrix M is described and illustrated numerically. Derivations of the algorithm and sufficient conditions for convergence are outlined. DOE

N85-13496# Sandia Labs., Albuquerque, N. Mex.
EXPERT SYSTEMS IN DESIGN AND MANUFACTURE
D. W. Palmer and E. D. Machin 1984 3 p Presented at the EMT AS Conf., Raleigh, N. Car., 1 Oct. 1984
(Contract DE-AC04-76DP-00789)
(DE84-005522; SAND-84-0092C; CONF-841032-1) Avail: NTIS HC A02/MF A01

Development of Expert systems to help in design and manufacture began at Sandia in mid-1983. Unlike most software development efforts, these systems became useful immediately, even when only partially finished. This artificial intelligence approach far exceeds written design guides or documentation in extending engineering ranks that are thinned by retirement and in tutoring permanent replacements, as well as giving assistance to general purpose engineers on one aspect of their project. Management and most engineers see the use of expert systems as a way of freeing up resources for development and research efforts that are often set aside during the crush of rush projects with straightforward applications. The history of expert systems utilization in cable and connector design and the first steps of implementation in IC production test construction is described. DOE

N85-13497# Los Alamos Scientific Lab., N. Mex. Administrative Data Processing Div.
TOWARD A NON-BUREAUCRATIC APPROACH TO QUALITY ASSURANCE IN DATA PROCESSING
Linda Brice, Linda Anderson, and John Connell Feb. 1984 18 p refs Presented at the 3rd Software Eng. Std. Appl. Workshop, San Francisco, 1 Oct. 1984; sponsored by IEEE
(Contract W-7405-eng-36)
(DE84-007484; LA-UR-84-607; CONF-841038-1) Avail: NTIS HC A02/MF A01

A quality assurance program for applications software has been developed within the Administrative Data Processing Division at Los Alamos National Laboratory. The goal of this program is that maintainable, flexible, and reliable software be produced in a cost effective manner, thereby increasing user satisfaction. The difference between this program and other, sometimes less than successful Q/A programs is that the developers have attempted to make it flexible and nonbureaucratic. By building in this flexibility, it is hoped that data processing personnel will be more likely to adhere to the established standards. The philosophy, development and implementation of this Q/A program is described. Techniques and the key elements used to ensure adherence to the standards are covered in detail. DOE

N85-13498# Sandia Labs., Albuquerque, N. Mex.
BOOLEAN APPROACH TO ZERO-ONE LINEAR PROGRAMMING
B. L. Hulme and L. S. Baca Jul. 1984 20 p refs
(Contract DE-AC04-76DP-00789)
(DE84-016654; SAND-84-1409) Avail: NTIS HC A02/MF A01

Problems of minimizing or maximizing a linear objective function in zero-one variables subject to linear constraints can be solved by Boolean algebraic methods. Both a general procedure for stating such problems in Boolean form and a solution procedure implemented by a SETS user program are given. The program uses the Boolean algebraic formula manipulation techniques of the SETS language. Sample problems illustrate how to make optimum choices in the contexts of physical protection, packing knapsacks, designing manufacturing processes and making assignments. DOE

N85-13499# Pacific Northwest Lab., Richland, Wash.
DEVELOPMENT AND VERIFICATION OF MCD-2 AND MOD-OA SIMULATION MODELS
A. H. Miller, W. J. Formica, E. L. Owczarski, ed., and J. Reeder, ed. Aug. 1984 171 p refs
(Contract DE-AC06-76RL-01830)
(DE84-017389; PNL-4864) Avail: NTIS HC A08/MF A01

A method for generating annual energy production estimates is presented which incorporates computer models that simulate the operation and power output of the MOD-2 and MOD-OA wind turbines. These simulation models were initially conceived to identify the effects of wind variability over space and time scales and thus to pinpoint whether wind speed and direction forecasting techniques were adequate for wind turbine operations. However, the verification of the models, performed using data from actual wind turbine sites, shows that they can be applied as tools in assessing the feasibility of wind energy in a particular situation. DOE

N85-13500# California Univ., Livermore. Lawrence Livermore Lab.
DOCUMENTATION FOR DIGLIB: DEVICE INDEPENDENT GRAPHICS LIBRARY
H. R. Brand Sep. 1984 111 p refs
(Contract W-7405-eng-48)
(DE84-017385; UCID-20171) Avail: NTIS HC A06/MF A01

DIGLIB (Device Independent Graphics Library) is a collection of FORTRAN callable subroutines designed with the following goals: (1) easily usable by the casual graphics programmer for 2D plotting; (2) device independent (as such as possible); (3) small and reasonably fast; (4) device drivers are as simple as possible, and therefore easy to write, and device drivers may be written in FORTRAN when desired; (5) maintainable; (6) compatible with RT-11, RSX-11M, IAS, and VMS; and (7) compatible with MACRO, FORTRAN, F4P, FORTRAN-77, and OMSI PASCAL. DIGLIB comes very close to meeting all of the above design goals. Maintainability has been enhanced by using the INCLUDE feature of FORTRAN-IV-PLUS. Compatibility with RT-11 has been maintained by with OMSI PASCAL has been maintained by avoiding any FORTRAN I/O. Drivers are available for a variety of devices under RSX-11M, TSX, RT-11 and VMS. These include Tektronix 4000 series terminals, Retro-Graphics enhancements to several terminal types, HP 26xx terminals, and plotters. DOE

N85-13501# Sandia Labs., Albuquerque, N. Mex.
USERS MANUAL FOR BRGLM: INTERACTIVE GENERAL LINEAR MODEL REGRESSION, VERSION 3
J. T. Ringland and R. E. Bohrer Aug. 1984 105 p refs
(Contract DE-AC04-76DP-00789)
(DE84-017386; SAND-84-8226) Avail: NTIS HC A06/MF A01

The BRGLM is an interactive computer program written in FORTRAN 77 to fit data to general linear regression models by least squares and to provide a wide variety of statistical diagnostic information about the fit. Less detailed all subsets and stepwise regression routines are also included. In addition, there are several facilities for interactive management (setting missing data flags, various transformations) and tools for constructing design matrices in the more common specialized models such as factorials, cubic splines, and autoregressions. This manual describes how to use BRGLM and, in its appendices, gives details of the computations carried out. DOE

N85-13502# Argonne National Lab., Ill.
NEW DIRECTIONS IN SOFTWARE FOR ADVANCED COMPUTER ARCHITECTURES
J. J. Dongarra, E. I. Lusk, R. A. Overbeek, B. T. Smith, and D. C. Sorensen Aug. 1984 33 p refs
(Contract W-31-109-eng-38)
(DE84-017435; ANL/MCS-TM-32) Avail: NTIS HC A03/MF A01

A collection of short position papers that were prepared for the Workshop on Taxonomy of Parallel Algorithms is presented. These papers represent the authors views on directions of research that should be undertaken with regards to programming methodology, algorithm design, and software implementation for advanced computer architectures. Several projects have been initiated by the authors within the general framework outlined in these articles since they were written. The concepts formulated here are expected to serve as a foundation for future work in multiprocessing. DOE

N85-13503# Stuttgart Univ. (West Germany). Inst. fuer Kernenergetik und Energiesysteme.
DESIGN AND IMPLEMENTATION OF A MODULAR PROGRAM SYSTEM FOR STATISTICAL ANALYSES Ph.D. Thesis [ENTWURF UND IMPLEMENTIERUNG EINES MODULAREN PROGRAMMSYSTEMS ZUR DURCHFUEHRUNG STATISTISCHER ANALYSEN]
Wilhelm Beck Jan. 1984 200 p refs In GERMAN, ENGLISH summary
(IKE-4-114; ISSN-07173-6892) Avail: NTIS HC A09/MF A01

A modular program system STAR was designed and implemented for statistical methods. STAR is a component of the program system RSYST. The statistical methods, which are based on the Monte Carlo method, are used for the solution of scientific and technical problems. The design of STAR considers: users with different knowledge of data processing and statistics; the variety of statistical methods, generating and evaluating procedures; the processing of large data sets in complex structures; the coupling to other components of RSYST and RSYST foreign programs; and that the system can be easily modified and enlarged. Four examples are given which demonstrate the application of STAR. The most important computer programs are enclosed, together with some basic explanations. Author (ESA)

N85-13504# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abteilung Mathematische Verfahren und Datenverarbeitung.
FORMATS FOR NUMERICAL AND TEXTUAL DATA IN DATA PROCESSING
Gerhard Roseneau Dec. 1983 69 p refs In GERMAN; ENGLISH summary
(DFVLR-Mitt-84-07) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 25.50

The representation of numerical values and texts in data processing is discussed. A distinction is made between external formats for visually readable representations and direct formats which use the elements of the representation inside the computer. Examples are given to explain the two format types for numerical values. Author (ESA)

N85-13505# Federal Compiler Testing Center, Falls Church, Va. Federal Software Testing Center.
BURROUGHS CORPORATION B26-CPU, B20 COBOL, RELEASE 4.0 Validation Summary Report
23 Mar. 1984 74 p refs
(PB84-216241; OIT/FSTC-84/138) Avail: NTIS HC A04/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the Burroughs Corporation, B20 COBOL, Release 4.0 running under the BTOS COBOL, Release 4.0 provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated against the High Intermediate level of FIPS PUB 21-1. The VSR is made up of several sections showing all the discrepancies found, if any. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed. GRA

N85-13506# Federal Compiler Testing Center, Falls Church, Va. Federal Software Testing Center.
BURROUGHS CORPORATION B26-CPU, B20 COBOL VERSION 4.0 (COBOL TECHNICAL REPORT)
28 Mar. 1984 16 p refs
(PB84-216258; OIT/FSTC-84/143) Avail: NTIS HC A02/MF A01 CSCL 09B

This FSTC Technical Report for the Burroughs Corporation, B20 COBOL Version 4.0 running under the BATOS Version 4.0 provides a consolidated summary of the results obtained from the evaluation of the subject compiler against the Indexed 1-0, Levels 1 and 2 of the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). This technical report is made up of several sections showing all the discrepancies found, if any. A companion report Validation Summary Report OIT/FSTC-84/138 provides information regarding the validation of the compiler as the High-Intermediate level of Federal Standard COBOL (FIPS PUB 21-1). GRA

N85-13507# Federal Compiler Testing Center, Falls Church, Va. Federal Software Testing Center.
CONVERGENT TECHNOLOGIES NGEN CP001, CT COBOL VERSION 9.0 Validation Summary Report
23 Mar. 1984 72 p refs
(PB84-216266; OIT/FSTC-84/135) Avail: NTIS HC A04/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the Convergent Technologies, CT COBOL Version 9.0 running under the CTOS Version 9.0 provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated against the High Intermediate level of FIPS PUB 21-1. The VSR is made up of several sections showing all the discrepancies found, if any. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed. GRA

N85-13508# Federal Compiler Testing Center, Falls Church, Va. Federal Software Testing Center.
CONVERGENT TECHNOLOGIES, INCORPORATED, NGEN CP001, CT COBOL VERSION 9.0 (COBOL TECHNICAL REPORT)
28 Mar. 1984 16 p refs
(PB84-216274; OIT/FSTC-84/142) Avail: NTIS HC A02/MF A01 CSCL 09B

This FSTC Technical Report for the Convergent Technologies, Inc., CT COBOL Version 9.0 running under the CTOS Version 9.0 provides a consolidated summary of the results obtained from the evaluation of the subject compiler against the Indexed 1-O, Levels 1 and 2 of the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). This technical report is made up of several sections showing all the discrepancies found, if any. A companion report Validation Summary Report OIT/FSTC-84/135 provides information regarding the validation of the compiler as the High-Intermediate level of Federal Standard COBOL (FIPS PUB 21-1). GRA

N85-13509# Federal Compiler Testing Center, Falls Church, Va. Federal Software Testing Center.
COMPUTER SCIENCES CORPORATION UNIVAC 1100/80, CSTS COBOL RELEASE COB250 Validation Summary Report
31 May 1984 73 p refs
(PB84-216282; OIT/FSTC-84/230) Avail: NTIS HC A04/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the Computer Sciences Corporation, CSTS COBOL Release COB250 running under the CSTS SYS330 Release 3.0 provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated against the May 31, 1984 level of FIPS PUB 21-1. The VSR is made up of several sections showing all the discrepancies found, if any. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed. GRA

N85-13510# Federal Compiler Testing Center, Falls Church, Va. Federal Software Testing Center.
CONTROL DATA CORPORATION CYBER 205 MODEL 442, FORTRAN 200 (G201-25) Validation Summary Report
2 May 1984 16 p refs
(PB84-216290; OIT/FSTC-84/245) Avail: NTIS HC A02/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the Control Data Corporation, FORTRAN 200 (G201-25) running under the VSOS 2.1.5 Level 607 (G201-01) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1978 FORTRAN Standard (X3.9-1978/FIPS PUB 69). The compiler was validated against the Full Level FORTRAN level of FIPS PUB 69. The VSR is made up of several sections showing all the discrepancies found, if any. These include an overview of the validation which lists all categories of discrepancies within X3.9-1978, a detailed listing of dicrepancies together with the tests which failed. GRA

N85-13511# Federal Compiler Testing Center, Falls Church, Va. Federal Software Testing Center.
C3, INCORPORATED NGEN CP001, COBOL VERSION 9.0 Validation Summary Report
23 Mar. 1984 72 p refs
(PB84-216308; OIT/FSTC-84/141) Avail: NTIS HC A04/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the C3, Inc., C3 COBOL Version 9.0 running under the C3 Version 9.0 provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated against the High Intermediate level of FIPS PUB 21-1. The VSR is made up of several sections showing all the discrepancies found, if any. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed. GRA

N85-13512# Office of Software Development, Falls Church, Va. Federal Software Testing Center.
UNITED INFORMATION SERVICES, INC., CRAY 1-S/2000, FORTRAN CFT 1.10 Validation Summary Report
13 Dec. 1983 29 p
(PB84-227685; OIT/FSTC-83/283) Avail: NTIS HC A03/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the United Information Services, Inc. FORTRAN CFT 1.10 running under the COS Level C12 1.11 provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1978 FORTRAN Standard (X3.9-1978/FIPS PUB 69). The compiler was validated against the Full Level FORTRAN level of FIPS PUB 69. The VSR is made up of several sections showing all the discrepancies found, if any. These include an overview of the validation which lists all catagories of discrepancies within X3.9-1978, and a detailed listing of discrepancies together with the tests which failed. GRA

N85-13513# Federal Compiler Testing Center, Falls Church, Va. Federal Software Testing Center.
DATAPOINT CORPORATION DATAPOINT 6600, 8600, DOS COBOL VERSION 3.6 Validation Summary Report
13 Jul. 1984 46 p refs
(PB84-242973; OIT/FSTC-84/280) Avail: NTIS HC A03/MF A01 CSCL 09B

The results obtained from the validation of the compiler DOS COBOL version 3.6 against the 1974 COBOL standard (X3.23-1974/FIPS PUB 21-1) are summarized. The compiler was validated against the low level of FIPS PUB 21-1. The validation summary report is made up of several sections showing all the discrepancies found, if any. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed. R.S.F.

62 COMPUTER SYSTEMS

Includes computer networks.

N85-13514*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
TEST EXPERIENCE ON AN ULTRARELIABLE COMPUTER COMMUNICATION NETWORK
Larry W. Abbott Dec. 1984 8 p refs Presented at the AIAA/IEEE 6th Digital Avionics Conf., Baltimore, 3-6 Dec. 1984 Prepared in cooperation with NASA. Ames Research Center
(NASA-TM-85915; H-1268; NAS 1.15:85915; AIAA-Paper-84-2649) Avail: NTIS HC A02/MF A01 CSCL 09B

The dispersed sensor processing mesh (DSPM) is an experimental, ultra-reliable, fault-tolerant computer communications network that exhibits an organic-like ability to regenerate itself after suffering damage. The regeneration is accomplished by two routines - grow and repair. This paper discusses the DSPM concept for achieving fault tolerance and provides a brief description of the mechanization of both the experiment and the six-node experimental network. The main topic of this paper is the system performance of the growth algorithm contained in the grow routine. The characteristics imbued to DSPM by the growth algorithm are also discussed. Data from an experimental DSPM network and software simulation of larger DSPM-type networks are used to examine the inherent limitation on growth time by the growth algorithm and the relationship of growth time to network size and topology. Author

N85-13515# Los Alamos Scientific Lab., N. Mex.
USER BEHAVIOR UPON INTRODUCTION OF A NETWORK HELP SYSTEM
Mary L. Stoddard, Kathryn P. Berkbigler, Robert M. Wheat, and Eva Au Peter 1984 16 p refs
(Contract W-7405-eng-36)
(DE84-016466; LA-UR-84-2683) Avail: NTIS HC A02/MF A01

An online help system, called ICNHELP, was implemented on the large Los Alamos Integrated Computing Network. Users from three different operating systems could quickly access summary information on network capabilities. Usage was monitored for a five-month period, and users were given the opportunity to comment online. There were three times as many accesses as users. Most users accessed ICNHELP to jog their memories about specific command information, but a high number used it as a browsing tool to learn about network capabilities. The study reveals that the user interface is important in user acceptance of an online user assistance tool, but the established patterns of user behavior and model of advertising also strongly affect the success of the system. DOE

63 CYBERNETICS

Includes feedback and control theory.

For related information see also *54 Man/System Technology and Life Support.*

N85-13516*# Martin Marietta Aerospace, Denver, Colo.
EVALUATION OF AUTOMATED DECISIONMAKING METHODOLOGIES AND DEVELOPMENT OF AN INTEGRATED ROBOTIC SYSTEM SIMULATION
Dennis C. Haley, Boni J. Almand, Mark M. Thomas, Linda D. Krauze, Keith D. Gremban, James C. Sanborn, Joy H. Kelly, and Thomas M. Depkovich Sep. 1984 172 p refs 3 Vol.
(Contract NAS1-16759)
(NASA-CR-172401; NAS 1.26:172401; MCR-84-549) Avail: NTIS HC A08/MF A01 CSCL 09B

A generic computer simulation for manipulator systems (ROB-

SIM) was implemented and the specific technologies necessary to increase the role of automation in various missions were developed. The specific items developed are: (1) capability for definition of a manipulator system consisting of multiple arms, load objects, and an environment; (2) capability for kinematic analysis, requirements analysis, and response simulation of manipulator motion; (3) postprocessing options such as graphic replay of simulated motion and manipulator parameter plotting; (4) investigation and simulation of various control methods including manual force/torque and active compliances control; (5) evaluation and implementation of three obstacle avoidance methods; (6) video simulation and edge detection; and (7) software simulation validation. B.G.

N85-13517# Maryland Univ., College Park. Dept. of Electrical Engineering.

FREQUENCY RESPONSE DESIGN METHODS FOR LARGE SCALE SYSTEMS Final Report

William S. Levine, P. S. Krishnaprasad, and Shih Ho Wang 1983 79 p refs
(Contract DE-AC01-80RA-50420)
(DE84-014161; DOE/RA-50420-T1) Avail: NTIS HC A05/MF A01

The main idea behind this project was to try to extend the existing techniques for the design of control systems in two ways. First, there are several good methods for designing centralized linear feedback controllers for linear multivariable systems. These methods are limited to systems with relatively few inputs and outputs. Thus, one of the major efforts was to develop techniques whereby these design methods could be extended so as to be applicable to large scale systems. Second, there are a number of concepts that are fundamental to the above-mentioned design procedures for linear systems. Two of the most important of these are the concepts of canonical forms and observers. Thus the second major effort was to develop equivalent concepts of observers and canonical forms for nonlinear systems. DOE

N85-13518# Oak Ridge National Lab., Tenn. Engineering Physics and Mathematics Div.

MINIMAL CUT-SET METHODOLOGY FOR ARTIFICIAL INTELLIGENCE APPLICATIONS

C. R. Weisbin, G. deSaussure, J. Barhen, E. M. Oblow, and J. C. White 1984 18 p refs Presented at the Natl. Conf. on Artificial Intelligence, Austin, Tex., 6-10 Aug. 1984
(Contract DE-AC05-84OR-21400)
(DE84-016674; CONF-840889-1) Avail: NTIS HC A02/MF A01

This paper suggests that given the considerable (and growing) literature of expert systems for diagnostics and maintenance, consideration of the theory of minimal cut sets should be most beneficial. The minimal cut-set approach uses disjunctive normal form in Boolean algebra and various Boolean operators to simplify very complicated three structures composed of AND/OR gates. The simplification reduces the tree to an equivalent diagram displaying the smallest combinations of independent component failures which could result in the fault symbolized by the root of the the tree and called the top event. This paper reviews minimal cut-set theory and illustrates its application with an example. Using this approach, expert diagnostic systems would have a tool in which, with minimum search, the description of fault causes is made clear and explicit, contributor sequences to a top event fault are easily quantified and ranked, and the probability of the top event is easily computed. Finally, the application of minimal cut sets to planning and problem solving is developed. DOE

N85-13519# Oak Ridge National Lab., Tenn. Center for Engineering Systems Advanced Research.

REAL-TIME PLANNING BY AN INTELLIGENT ROBOT

J. Barhen, C. R. Weisbin, and G. deSaussure 12 Aug. 1984 4 p refs Presented at the ASME Intern. Computers in Eng. Conf., Las Vegas, Nev., 12 Aug. 1984 Submitted for publication
(Contract DE-AC05-84OR-21400)
(DE84-016669; CONF-840831-2) Avail: NTIS HC A02/MF A01

The development of automated decision making capabilities for an autonomous intelligent machine operating in dynamic real-world environments is one of the key research activities currently carried out within the Center for Engineering Systems Advanced Research at the Oak Ridge National Laboratory. The conceptual design of a robot operating system is presented as a basis for further research in the area of real-time planning. The robot operating system controls and directs the robot's planning and reasoning capabilities by embedding them, as asynchronous parallel algorithms, within a multiprocessor operating system built for resource allocation, process (e.g., sensors, arms,---) management, etc. The Center for Engineering Systems Advanced Research HERMIES-type robots provide the experimental focus for this activity. DOE

N85-13520# Oxford Univ. (England). Dept. of Engineering Science.

SELF-TUNING CONTROL OF OFFSET: A UNIFIED APPROACH

P. S. Tuffs and D. W. Clarke 1984 48 p refs
(OUEL-1539/84) Avail: NTIS HC A03/MF A01

Offset between measurement and desired value when regulating a plant subjected to constant load-disturbances about a nonzero set-point, with the controlled autoregressive integrated moving average (CARIMA) model in self tuning control is discussed. The normal ad-hoc insertion of an integrator solves the problem but can introduce others (such as convergence difficulties). One solution is to use a CARIMA plant model in which the noise term is nonstationary, and it is shown that good adaptive behavior is then possible with generalized minimum-variance and pole-placement self tuning controllers. The approach produces integral control terms in a natural way, and for simplified plant models leads directly to a general PID algorithm. Author (ESA)

N85-13521# Oxford Univ. (England). Dept. of Engineering Science.

LONG-RANGE PREDICTIVE CONTROL USING WEIGHTING-SEQUENCE MODELS

D. W. Clarke and L. Zang 1984 28 p refs
(OUEL-1542/84) Avail: NTIS HC A03/MF A01

The predictive control algorithm (PCA), dynamic matrix control (DMC) and identification/command (IDCOM) process control algorithms are compared. It is shown that they are capable of providing good stable control under certain conditions. The IDCOM, however, is seen by simulations to be the least satisfactory approach. The derivations show that all the methods are capable of further refinement; in particular DMC (potentially the most robust) benefits from using a proper predictor and cost-function rather than the heuristics of the original approach. The applicability of the algorithms and the restrictions imposed by the simple assumed plant model are discussed. Author (ESA)

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N85-13522 Technische Univ., Munich (West Germany). Inst. fuer Informatik.

ON THE FORMAL DEVELOPMENT OF GRAPH THEORETICAL ALGORITHMS BY TRANSFORMATION [ZUR FORMALEN ENTWICKUNG VON GRAPHIETHEORETISCHEN ALGORITHMEN DURCH TRANSFORMATION]

Rudolf Berghammer Feb. 1984 154 p refs In GERMAN
(TUM-I8403) Copyright. Avail: Issuing Activity

The possibility of a transformative development of programs was investigated and tested for graph theoretical algorithms. Abstract data types for the characterization of graphs are discussed. The transformation of graph theoretical algorithms, especially concerning nondeterminism, is examined. Transformation rules for program development are elaborated and classified. Adequate language elements for the programming of graph theoretical algorithms are defined. Application examples are given. Author (ESA)

N85-13523 National Physical Lab., Teddington (England). Div. of Information Technology and Computing.
LEAST SQUARES SPLINE REGRESSION WITH BLOCK-DIAGONAL VARIANCE MATRICES
M. G. Cox and P. E. Manneback (Namur Univ., Belgium) May 1984 19 p refs
(NPL-DITC-40/84; ISSN-0262-5369) Copyright. Avail: Issuing Activity

A numerical method for the least squares fitting of experimental data by spline functions in the case where the data errors are correlated, and for which the variance matrix is specified, is presented. The method permits splines of any order; the knots of the spline can be arbitrary in number and position; and variance matrices can be block diagonal in form. The method can handle, as special cases, conventional spline regression problems and spline regression problems with general, unstructured variance matrices. An application to gamma spectrometry, in which the blocks of the variance matrix have special structure, is treated. Author (ESA)

N85-13524 Intermountain Forest and Range Experiment Station, Ogden, Utah.
DEVELOPMENT OF STRUCTURED REGRESSION HYPOTHESES/INTERACTIVE DESCRIPTIVE GEOMETRY THROUGH FIVE DIMENSIONS
Chester E. Jensen Mar. 1984 137 p refs
(INT-324) Avail: NTIS HC A07/MF A01

Regression hypotheses admitted to statistical evaluation should be germane to relations between the variables considered. This constraint is easily violated with the screening of arbitrarily adopted sets of hypotheses. Sequential polynomials in additive models, for example, may include components that are not commensurate with expectation (prior knowledge) and may not include those that are (e.g., unique interaction terms) and, since the analytical results from the screening of meaningless hypotheses may themselves be meaningless, there is substantial incentive for serious pre-analysis consideration of the hypotheses to be evaluated. An effort is made to initiate solutions to the hypothesis development problem through discussion and by showing analysts how to develop preanalysis hypotheses graphically, regardless of complexity, from accumulated knowledge and existing data. M.G.

N85-13525# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
INDUCTION OF FUZZY DECISION RULES [INDUCAO DE REGRAS DE DECISAO NEBULOSAS]
Orion deOliveira Silva and Celso deRenna e Souza Apr. 1983 7 p refs In PORTUGUESE; ENGLISH summary Presented at the IEEE Intern. Conf. Latincon 84, Mexico City, 9-13 Jul. 1984
(INPE-3053-PRE/474) Avail: NTIS HC A02/MF A01

Results and concepts of investigations in a fuzzy set theory encountered in the literature are presented. The main reasons for inducing decision rules are the need to reduce the amount of rules and modeling of new rules by induction. The induction of new decision rules consists of a set of rules with the same conclusion (fuzzy or Boolean) and different premises (fuzzy or Boolean) as well as certainty degrees. Definition of such concepts as production rule, consistent rule, degree of certainty, induced consistent rule, etc., are presented. Th problem of Boolean decision rules and fuzzy interference are analyzed. Decision rules can be applied in medical diagnosis (MYCIN computerized consultation), geological prospecting, error detection in space systems, etc. The advantage of the induction method is its general applicability and simplicity. Transl. by B.G.

N85-13526*# Wisconsin Univ., Madison. Dept. of Electrical and Computer Engineering.
NOISE REMOVAL IN MULTICHANNEL IMAGES
Chia-Lung Yeh and Roland T. Chin 1983 7 p refs
(Grant NAGw-380)
(NASA-CR-174116; NAS 1.26:174116) Avail: NTIS HC A02/MF A01 CSCL 12A

An adaptive filtering method, the Windrow-Hoff algorithm, for enhancing multichannel signals against aditive noise was investigated. It removes noise for multichannel images containing correlated signal compoments but uncorrelated noise components. Its potential application is the enhancement of multichannel microwave satellite images as a preprocessing step for the extraction of geophysical parameters. Author

N85-13527*# Wisconsin Univ., Madison. Dept. of Electrical and Computer Engineering.
RESTORATION OF MULTICHANNEL MICROWAVE RADIOMETERIC IMAGES
Roland T. Chin, Chia-Lung Yeh, and William S. Olson 1983 28 p refs Presented at the Computer Vision and Pattern Recognition Conf., Arlington, Va., 19-23 Jun. 1983 Submitted for publication
(Grant NAGw-380)
(NASA-CR-174115; NAS 1.26:174115) Avail: NTIS HC A03/MF A01 CSCL 12A

A constrained iterative image restoration method is applied to multichannel diffraction-limited imagery. This method is based on the Gerchberg-Papoulis algorithm utilizing incomplete information and partial constraints. The procedure is described using the orthogonal projection operators which project onto two prescribed subspaces iteratively. Some of its properties and limitations are also presented. The selection of appropriate constraints was emphasized in a practical application. Multichannel microwave images, each having different spatial resolution, were restored to a common highest resolution to demonstrate the effectiveness of the method. Both noise-free and noisy images were used in this investigation. Author

N85-13528*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
GENERALIZED FORMULATION OF TVD LAX-WENDROFF SCHEMES Final Report
P. L. Roe Oct. 1984 16 p refs
(Contract NAS1-17070)
(NASA-CR-172478; ICASE-84-53; NAS 1.26:172478) Avail: NTIS HC A02/MF A01 CSCL 12A

The work of Davis which imports the concept of total variation diminution (TVD) into non-upwinded, Las-Wendroff type schemes is reformulated in a way which is easier to analyze. The analysis reveals a class of TVD schemes not observed by Davis. Only the case of one dimensional linear advection is treated. R.S.F.

N85-13529*# Mississippi State Univ., Mississippi State. Dept. of Aerospace Engineering.
TRANSFORMATION OF TWO AND THREE-DIMENSIONAL REGIONS BY ELLIPTIC SYSTEMS Semiannual Status Report, 15 May - 14 Nov. 1984
E. Wayne Mastin and Joe F. Thompson 14 Dec. 1984 6 p
(Grant NsG-1577)
(NASA-CR-174176; NAS 1.26:174176) Avail: NTIS HC A02/MF A01 CSCL 12A

The research during this period continued to expand the class of numerical algorithms that can be accurately and efficiently implemented on overlapping grids. Whereas previous calculations have been used to solve elliptic equations and to find the steady-state solution of parabolic equations, the present work is aimed towards developing time-accurate solution techniques for parabolic and hyperbolic equations. The primary difficulty here is in the correct treatment of the interior boundary nodes that must be updated at each iteration. The implementation of explicit methods is straightforward. However, the common practice of lagging these values when using an implicit methods leads to inconsistencies in the difference equation. One way to avoid this problem is to alternately calculate with an implicit and an explicit method on each subgrid. With this procedure, the explicit method generates boundary values at the next time level which are then used by the implicit step. It can be shown that when a backward implicit method is combined with a forward explicit method, the composite method is second order accurate and unconditionally stable for linear problems. A second area in which progress can be reported is in the distribution of grid points on curves and surfaces. B.W.

N85-13530# Princeton Univ., N. J. Dept. of Statistics.

EFFECTS OF CHANGING THE SIGNS OF ROWS AND COLUMNS OF A MATRIX AND THE HYPERHOLIC TRANSPOSE

Javier Cabrera and Geoffrey S. Watson Feb. 1984 15 p refs
(Contract DE-AC02-81ER-10841; Grant NSF MCS-82-1381)
(DE84-014651; DOE/ER-10841/8; TR-262-Ser-2) Avail: NTIS HC A02/MF A01

If the sign of p less than or equal to m columns (or rows) of a m x m positive definite symmetric matrix A is changed, the resultant matrix B has p negative eigenvalues. A system of inequalities for the eigenvalues of B in terms of the eigenvalues of A is given. To obtain the latter, characterizations of the eigenvalues of B which are the analogous to the minimum-maximum properties of the eigenvalues of a symmetric A, i.e. the courant-Fischer theorem were developed. DOE

N85-13531# Sandia Labs., Albuquerque, N. Mex. Numerical Mathematics Div.

CONSERVATION LAWS AND THE NUMERICAL SOLUTION OF ODEs

Lawrence F. Shampine Jun. 1984 25 p refs
(Contract DE-AC04-76DP-00789)
(DE84-016206; SAND-84-1241) Avail: NTIS HC A02/MF A01

Many physical systems described by an initial value problem for a system of ordinary differential equations (ODEs) conserve physical quantities, such as the net charge or total energy, as the system evolves. Typical codes for the numerical solution of the ODEs will not conserve these quantities, and this can lead to solutions which are not even qualitatively correct. One way to impose conservation laws is to perturb the numerical solution at each step of the integration. A simple theory is developed which tells how this should be done so as to guarantee convergence of codes based on one-step methods. It is also easy to interpret the effect on the accuracy of the perturbations. DOE

N85-13532# Oak Ridge National Lab., Tenn.

MULTIGRID ITERATION SOLUTION PROCEDURE FOR SOLVING THREE-DIMENSIONAL SETS OF COUPLED EQUATIONS

D. R. Vondy Aug. 1984 49 p refs
(Contract DE-AC05-84OR-21400)
(DE84-016515; ORNL/TM-9248) Avail: NTIS HC A03/MF A01

A procedure of iterative solution was coded in FORTRAN to apply the multigrid scheme of iteration to a set of coupled equations for three-dimensional problems. The incentive for this effort was to make available an implemented procedure that may be readily used as an alternative to overrelaxation, of special interest in applications where the latter is ineffective. The multigrid process was found to be effective, although noncompetitive with simple overrelaxation for simple, small problems. Absolute error level evaluation was used to support methods assessment. A code source listing is presented to allow ready application when the computer memory size is adequate, avoiding data transfer from auxiliary storage. Included are the capabilities for one-dimensional rebalance and a driver program illustrating use requirements. Feedback of additional experience from application is anticipated. DOE

N85-13533# Oak Ridge National Lab., Tenn.

MULTIGRID ITERATION SOLUTION PROCEDURE FOR SOLVING TWO-DIMENSIONAL SETS OF COUPLED EQUATIONS

D. R. Vondy Jul. 1984 76 p refs
(Contract DE-AC05-84OR-21400)
(DE84-016554; ORNL-TM-9030) Avail: NTIS HC A05/MF A01

A procedure of iterative solution was coded in FORTRAN to apply the multigrid scheme of iteration to a set of coupled equations for solving two-dimensional sets of coupled equations. The incentive for this effort was to make available an implemented procedure that may be readily used as an alternative to overrelaxation, of special interest in applications where he latter is ineffective. The multigrid process was found to be effective, although not always competitive with simple overrelaxation. Implementing an effective and flexible procedure is a time-consuming task. Absolute error level evaluation was found to be essential to support methods assessment. A code source listing is presented to allow simple application when the computer memory size is adequate, avoiding data transfer from auxiliary storage. Included are the capabilities for one-dimensional rebalance and a driver program illustrating use requirements. Feedback of additional experience from application is anticipated. DOE

N85-13534# Los Alamos Scientific Lab., N. Mex.

PARALLEL PROCESSING OF NUMERICAL TRANSPORT ALGORITHMS

B. R. Wienke and R. E. Hiromoto 1984 16 p refs Presented at Conf. on Vector and Parallel Processors in Computational Sci. 2, Oxford, 28-31 Aug. 1984
(Contract W-7405-eng-36)
(DE84-016825; LA-UR-84-2609; CONF-8408100-1) Avail: NTIS HC A02/MF A01

The multigroup, discrete ordinates representation for the linear transport equation enjoys widespread computational use and popularity. Serial solution schemes and numerical algorithms developed over the years provide a timely framework for parallel extension. The parallel structure and extension of a number of standard S sub n approaches were investigated on the Denelcor HEP. Concurrent inner sweeps, coupled acceleration techniques, synchronized inner-outer loops, and chaotic iteration are described, and results of computations are contrasted. The multigroup representation and serial iteration methods are also detailed. The basic iterative S sub n method lends itself to parallel tasking, portably affording an effective medium for performing transport calculations on future architectures. This analysis represents a first attempt to extend serial S sub n algorithms to parallel environments and provides good baseline estimates on ease of parallel implementation, relative algorithm efficiency, comparative speedup, and some future directions. Basic inner-outer and chaotic iteration strategies both easily support comparably high degrees of parallelism. DOE

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N85-13535*# Illinois Inst. of Tech., Chicago. Dept. of Electrical Engineering.

THE UNDETECTED ERROR PROBABILITY FOR SHORTENED HAMMING CODES

Daniel J. Costello, Jr. and Shu Lin (Hawaii Univ., Honolulu) 12 Dec. 1984 16 p refs
(Grant NAG5-234)
(NASA-CR-174175; NAS 1.26:174175) Avail: NTIS HC A02/MF A01 CSCL 12A

Hamming or shortened Hamming codes are widely used for error detection in data communications. For example, the CCITT (International Telegraph and Telephone Consultative Committee) recommendation X.25 for packet-switched data networks adopts a distance-4 cyclic Hamming code with 16 parity-check bits for error detection. The natural length of this code is n = 2(15)-1 = 32,767. In practice the length of a data packet is no more than a few thousand bits which is much shorter than the natural length of the code. Consequently, a shortened version of thecode is used. Often the length of a data packet varies, say from a few hundred bits to a few thousand bits, hence the code must be shortened by various degrees. Shortening affects the performance of the code. The error-detection performance of shortened Hamming codes, particularly the codes obtained from the distance-4 Hamming codes adopted by CCITT recommendation X.25, is investigated. A method for computing the probability of an undetected error is presented. M.G.

N85-13536# Freiburg Univ. (West Germany). Inst. fuer Angewandte Mathematik.
INTERVAL MATHEMATICS REPORTS
1984 77 p refs Partly in GERMAN and ENGLISH
(Rept-84/1) Avail: NTIS HC A05/MF A01

A method for computing the cumulative probability distribution of a measure of investment value (such as rate of return) is presented. Initial value problems in systems governed by ordinary differential equations of first order with internal coefficients and interval initial values are treated. For individual titles, see N85-13537 through N85-13538.

N85-13537# Texas Univ., Arlington. Dept. of Mathematics.
RISK ANALYSIS WITHOUT MONTE CARLO METHODS
Ramon E. Moore *In* Freiburg Univ. Interval Math. Repts. 1984 p 1-48 refs (For primary document see N85-13536 04-65)
Avail: NTIS HC A05/MF A01

A simple method to compute the cumulative probability distribution of a measure of investment worth (such as rate of return) is presented. The method involves an arithmetic of inequalities (interval arithmetic) and, unlike Monte Carlo methods, it does not require large samples of points from assumed input distributions. The method can also be applied to implicit endogenous variables in economic models. Author (ESA)

N85-13538# Technische Hochshule, Leuna-Merseburg (West Germany).
INTERVAL-MATHEMATICAL TREATMENT OF INITIAL VALUE PROBLEMS OF ORDINARY DIFFERENTIAL EQUATIONS [INTERVALLMATHEMATISCHE BEHANDLUNG VON ANFANGSWERTAUFGABEN GEWOEHNLICHER DIFFERENTIALGLEICHUNGEN]
D. Oelschlaegel and V. Wiebigke *In* Freiburg Univ. Interval Math. Repts. 1984 p 51-65 refs In GERMAN (For primary document see N85-13536 04-65)
Avail: NTIS HC A05/MF A01

Initial value problems (IVP) in systems governed by ordinary differential equations of the first order with interval coefficients and interval initial values are treated. Each of these interval initial value problems are conceived of as a series of real IVP, obtained via a parameter vector and a vector of initial value conditions. The characteristic procedures of two methods which treat IVP in an interval-mathematical way are illustrated. Author (ESA)

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

No abstracts in this category.

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N85-13539# Brookhaven National Lab., Upton, N. Y. Physics Dept.
SUPERSYMMETRIC YANG-MILLS FIELDS AS AN INTEGRABLE SYSTEM AND CONNECTIONS WITH OTHER NON-LINEAR SYSTEMS
Ling-Lie Chau 1983 29 p refs Presented at a Workshop on Vertex Operators in Math. and Phys., Berkeley, Calif., 10-17 Nov. 1983
(Contract DE-AC02-76CH-00016)
(DE84-013231; BNL-34798; CONF-8311184-1) Avail: NTIS HC A03/MF A01

Integrable properties, i.e., existence of linear systems, infinite number of conservation laws, Reimann-Hilbert transforms, affine Lie algebra of Kac-Moody, and Bianchi-Baecklund transformation, are discussed for the constraint equations of the supersymmetric Yang-Mills fields. For N greater than or equal to 3 these constraint equations give equations of motion of the fields. These equations of motion reduce to the ordinary Yang-Mills equations as the spinor and scalar fields are eliminated. These understandings provide a possible method to solve the full Yang-Mills equations. Connections with other nonlinear systems are also discussed. DOE

N85-13540# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
UNRESTRICTED CONVERGENCE FOR GENERALIZED POISSON INTEGRALS
Peter Sjoegren 1984 10 p refs
(CTH-Math-1984-13; ISSN-0347-2809) Avail: NTIS HC A02/MF A01

A Poisson integral of L to the pth power function f on the maximal boundary of a symmetric space is discussed. For p > 1, it is shown that the generalized Poisson integral of f converges unrestrictedly to f at almost every boundary point. Estimation methods of maximal functions are used. Author (ESA)

N85-13541# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
MEASURE DETERMINING CLASSES OF BALLS IN BANACH SPACE
Ulla Dinger 1984 17 p refs Submitted for publication
(CTH-Math-1984-14; ISSN-0347-2809) Avail: NTIS HC A02/MF A01

Two Borel probability measures on C([0,1]) -- the Banach space of all real-valved continuous functions on [0,1] with the supremum norm -- are considered. The following point is addressed: The equality of the measures, when they agree on all balls with centers in a closed supporting linear subspace of C ([0,1]) and radius one. It is assumed that two Borel probability measures in a separable Banach space with the same Fourier transform must be equal. R.S.F.

N85-13542# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
INTERPOLATING SEQUENCES FOR H TO INFINITY IN THE BALL
Bo Berndtsson 1984 19 p refs Submitted for publication
(CTH-Math-1984-15; ISSN-0347-2809) Avail: NTIS HC A02/MF A01

An interpolating sequence for H to infinity is given. A sequence (an) of points in the unit ball of n-dimensional space of complex numbers is said to be interpolating for H to infinity when for any sequence (bn) in the unit disk there is a bounded holomorphic function F such that F(an) and bn are equal. Sufficient conditions for a sequence discrete in the unit ball to be an interpolation sequence for H to infinity are given. The Carleson interpolation theorem is extended to the case of dimension n. This condition is not necessary. Author (ESA)

N85-13543# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
TIME DISCRETIZATION OF PARABOLIC PROBLEMS BY THE DISCONTINUOUS GALERKIN METHOD
Kenneth Eriksson, Claes Johnson, and Vidar Thomee 1984 43 p refs Submitted for publication
(CTH-Math-1984-16; ISSN-0347-2809) Avail: NTIS HC A03/MF A01

The Discontinous Galerkin method for the time discretization of parabolic type problems in a general setting is analyzed. Error estimates are derived at the nodal points as well as uniformly in time for smooth and nonsmooth data. These estimates are combined with estimates for semi-discrete (in space) Galerkin approximations of parabolic problems to yield error estimates for complete discretization of such problems. Author (ESA)

N85-13544# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.

LOEB SOBOLEV SPACES WITH APPLICATIONS TO VARIATIONAL INTEGRALS AND DIFFERENTIAL EQUATIONS
L. Arkeryd 1984 30 p refs Submitted for publication
(CTH-Math-1984-19; ISSN-0347-2809) Avail: NTIS HC A03/MF A01

Spaces of the Sobolev type, but using the Loeb integral, are introduced. Solutions to relaxed variational problems and measure-valued solutions to hyperbolic problems are shown to be equivalent to solutions of the original problem in the Loeb Sobolev space. A relaxation type minimization problem on Sobolev spaces is discussed. Author (ESA)

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N85-13545# Joint Publications Research Service, Arlington, Va.
CHINA REPORT: SCIENCE AND TECHNOLOGY
16 Jan. 1984 38 p refs Transl. into ENGLISH from various Chinese articles
(JPRS-CST-84-001) Avail: NTIS HC A03/MF A01

The infrasonic waves associated with explosions are discussed. In addition, China's main acoustical instrument products are described. For individual titles, see N85-13546 through N85-13548.

N85-13546# Joint Publications Research Service, Arlington, Va.
MEASUREMENT OF INFRASONIC WAVES FROM REMOTELY DETONATED ARTIFICIAL EXPLOSION c71
Tu Yan and Liu Hongqi *In its* China Rept.: Sci. and Technol. (JPRS-CST-84-001) 16 Jan. 1984 p 8-12 Transl. into ENGLISH from Shengxue Xuebao (Beijing), v. 8, no. 2, Mar. 1983 p 118-121 (For primary document see N85-13545 04-70)
Avail: NTIS HC A03/MF A01

The measured results and data processing methods of infrasonic waves originating from a remotely detonated, 10,000-ton explosion are presented. First, the characteristics of the moving coil infrasonic detection system and the measurement techniques and results are described. Next, the analysis results (based on digital correlation techniques) of the recorded infrasonic wavetrains are presented. Finally, the acoustic pressure, obtained by analyzing and processing the infrasonic signals, and its average spectrum, calculated using the method of fast Fourier transform with Hamming window, are reported. R.S.F.

N85-13547# Joint Publications Research Service, Arlington, Va.
THEORETICAL AND OBSERVED DISPERSION OF ACOUSTIC-GRAVITY WAVES IN ATMOSPHERE c46
Tu Yan *In its* China Rept.: Sci. and Technol. (JPRS-CST-84-001) 16 Jan. 1984 p 13-23 refs Transl. into ENGLISH from Xhengxue Xuebao (Beijing), v. 8, no. 4, Jul. 1983 p 227-235 (For primary document see N85-13545 04-70)
Avail: NTIS HC A03/MF A01

The equation of infrasonic wave motion in a moving medium is derived, taking into account the effects of gravity. The equations of frequency dispersion are expressed in terms of divergence of velocity, using a stratified atmospheric model. The frequency dispersion characteristics of acoustics-gravity waves are computed using mulilayer atmospheric model. Numerical results show that both the phase velocity and group velocity have two components: an acoustic component and a gravitational component. The dispersion of the acoustic component is more sensitive to wind. Generally the short period group velocites in the downwind and upwind directions can differ by more than 10 percent. The gravitational velocity in certain atmospheric models is further divided into several components with different dispersion characteristics. This result is in good agreement with the observed frequency dispersion characteristics of infrasonic waves produced by a nuclear explosion. This phenomenon is illustrated by actual examples. R.S.F.

N85-13548# Joint Publications Research Service, Arlington, Va.
PRESENT STATUS, FUTURE PROSPECTS OF DOMESTIC ACOUSTICAL INSTRUMENTS c35
Li Guibin *In its* China Rept.: Sci. and Technol. (JPRS-CST-84-001) 16 Jan. 1984 p 24-30 Transl. into ENGLISH from Yingyong Shengxue (Beijing), v. 2, no. 3, Jul. 1983 p 1-4 (For primary document see N85-13545 04-70)
Avail: NTIS HC A03/MF A01

The product lines, specifications, and special features of China's main acoustical instrument products are described. The methods of operation nd the main problems associated with these products are discussed. Examples of the application of acoustical instruments are given. The main features of a digital signal analyzer are enumerated. R.S.F.

71 ACOUSTICS

Includes sound generation, transmission and attenuation. For noise pollution see *45 Environment Pollution*.

N85-13549*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Business Group.
EXPERIMENTAL INVESTIGATION OF SHOCK-CELL NOISE REDUCTION FOR DUAL-STREAM NOZZLES IN SIMULATED FLIGHT Final Report
B. A. Janardan, K. Yamamoto, R. K. Majjigi, and J. F. Brausch Washington NASA Nov. 1984 189 p refs
(Contract NAS3-23166)
(NASA-CR-3846; E-2283; NAS 1.26:3846; R83AEB358) Avail: NTIS HC A09/MF A01 CSCL 20A

Six scale-model nozzles were tested in an anechoic facility to evauate the effectiveness of convergent-divergent (C-D) terminations in reducing shock-cell noise of unsuppressed and mechanically suppressed coannular plug nozzels. One hundred fifty-three acoustic test points with inverted velocity profiles were conducted under static and simulated flight conditions. Diagnostic flow visualization with a shadowgraph and velocity measurements with a laser velocimeter were performed on selected plumes. Shock-cells were identified on the plug and downstream of the plug of the unsuppressed convergent coannular nozzle with truncated plug. Broadband peak frequencies predicted with the two shock-cell structures were correlated with the observed spectra using the measured shock-cell spacings. Relative to a convergent circular nozzle, the perceived noise level (PNL) data at an observer angle of 60 deg relative to inlet, indicated a reduction of (1) 6.5 dB and 9.2 dB with unsuppressed C-D coannular nozzle with truncated plug and (2) 7.7 dB and 8.3 dB with suppressed C-D coannular nozzle under static and simulated flight conditions, espectively. The unsuppressed C-D coannular nozzle with truncated plug, operating at the C-D design condition, had shock-cells downstream of the plug with no shock-cells on the plug. The downstream shock-cells were eliminated by replacing the truncated plug with a smooth extension to obtain an additional 2.4 dB and 3 dB front quadrant PNL reduction, under static and simulated flight conditions, respectively. Other results are discussed. M.G.

N85-13550*# General Electric Co., Cincinnati, Ohio.
EXPERIMENTAL INVESTIGATION OF SHOCK-CELL NOISE REDUCTION FOR SINGLE STREAM NOZZLES IN SIMULATED FLIGHT Final Report
K. Yamamoto, J. F. Brausch, T. F. Balsa, B. A. Janardan, and P. R. Knott Washington NASA Dec. 1984 397 p refs
(Contract NAS3-22514)
(NASA-CR-3845; E-2282; NAS 1.26:3845; R82AEB492) Avail: NTIS HC A17/MF A01 CSCL 20A

Seven single stream model nozzles were tested in the Anechoic Free-Jet Acoustic Test Facility to evaluate the effectiveness of convergent divergent (C-D) flowpaths in the reduction of shock-cell noise under both static and mulated flight conditions. The test nozzles included a baseline convergent circular nozzle, a C-D circular nozzle, a convergent annular plug nozzle, a C-D annular plug nozzle, a convergent multi-element suppressor plug nozzle, and a C-D multi-element suppressor plug nozzle. Diagnostic flow visualization with a shadowgraph and aerodynamic plume measurements with a laser velocimeter were performed with the test nozzles. A theory of shock-cell noise for annular plug nozzles with shock-cells in the vicinity of the plug was developed. The benefit of these C-D nozzles was observed over a broad range of pressure ratiosin the vicinity of their design conditions. At the C-D design condition, the C-D annual nozzle was found to be free of shock-cells on the plug. R.S.F.

N85-13551*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

STATIC JET NOISE TEST RESULTS OF FOUR 0.35 SCALE-MODEL QCGAT MIXER NOZZLES

Donald E. Groesbeck and Charles A. Wasserbauer Oct. 1984 47 p refs

(NASA-TM-86871; E-2333; NAS 1.15:86871) Avail: NTIS HC A03/MF A01 CSCL 20A

As part of the NASA Quiet Clean General Aviation Turbofan (QCGAT) engine mixer-nozzle exhaust system program, static jet exhaust noise was recorded at microphone angles of 45 to 155 deg relative to the nozzle inlet for a conventional profile coaxial nozzle and three 12-lobed coaxial mixer nozzles. Both flows in all four nozzles are internally mixed before being discharged from a single exhaust nozzle. The conventional profile coaxial nozzle jet noise is compared to the current NASA Lewis coaxial jet noise prediction and after applying an adjustment to the predicted levels based on the ratio of the kinetic energy of the primary and secondary flows, the prediction is within a standard deviation of 0.9 dB of the measured data. The mass average (mixed flow) prediction is also compared to the noise data for the three mixer nozzles with a reasonably good fit after applying another kinetic energy ratio adjustment (standard deviation of 0.7 to 1.5 dB with the measured data). The tests included conditions for the full-scale engine at takeoff (T.O.), cutback (86% T.O.) and approach (67% T.O.). M.G.

N85-13552*# College of William and Mary, Williamsburg, Va.

RESPONSE MEASUREMENTS FOR TWO BUILDING STRUCTURES EXCITED BY NOISE FROM A LARGE HORIZONTAL AXIS WIND TURBINE GENERATOR

Harvey H. Hubbard and Kevin P. Shepherd (Bionetics Corp.) Nov. 1984 25 p refs

(Contract NAS1-16978; Grant NAG1-166)

(NASA-CR-172482; NAS 1.26:172482) Avail: NTIS HC A02/MF A01 CSCL 20A

Window and wall acceleration measurements and interior noise measurements ere made for two different building structures during excitation by noise from the WTS-4 horizontal axis wind turbine generator operating in a normal power generation mode. With turbine noise input pulses resulted in acceleration pulses for the wall and window elements of the two tests buildings. Response spectra suggest that natural vibration modes of the structures are excited. Responses of a house trailer were substantially greater than those for a building of sturdier construction. Peak acceleration values correlate well with similar data for houses excited by flyover noise from commercial and military airplanes and helicopters, and sonic booms from supersonic aircraft. Interior noise spectra have peaks at frequencies corresponding to structural vibration modes and room standing waves; and the levels for particular frequencies and locations can be higher than the outside levels. Author

N85-13553*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

EVALUATION OF THE LANGLEY 4- BY 7-METER TUNNEL FOR PROPELLER NOISE MEASUREMENTS

P. J. Block and Garl L. Gentry, Jr. Dec. 1984 29 p refs

(NASA-TM-85721; L-15738; NAS 1.15:85721) Avail: NTIS HC A03/MF A01 CSCL 20A

An experimental and theoretical evaluation of the Langley 4- by 7- Meter Tunnel was conducted to determine its suitability for obtaining propeller noise data. The tunnel circuit and open test section are described. An experimental evaluation is performed using microphones placed in and on the tunnel floor. The reflection characteristics and background noise are determined. The predicted source (propeller) near-field/far-field boundary is given using a first-principles method. The effect of the tunnel-floor boundry layer on the noise from the propeller is also predicted. A propeller test stand used for part of his evaluation is also described. The measured propeller performance characteristics are compared with those obtained at a larger scale, and the effect of the test-section configuration on the propeller performance is examined. Finally, propeller noise measurements were obtained on an eight-bladed SR-2 propeller operating at angles of attack -8 deg, 0 deg, and 4.6 deg to give an indication of attainable signal-to-noise ratios. M.G.

N85-13554# Los Alamos Scientific Lab., N. Mex. Theoretical Div.

ELASTIC WAVE PROPAGATION THROUGH POLYCRYSTALS

J. E. Gubernatis and A.A. Maradudin (Calif. Univ., Irvine) 1984 8 p refs Presented at the Rev. of Progr. in Quantitative NDE, San Diego, Calif., 8-13 Jul. 1984

(Contract W-7405-eng-36)

(DE84-016772; LA-UR-84-2741; CONF-840738-2) Avail: NTIS HC A02/MF A01

Propagating elastic waves are commonly used to characterize nondestructively polycrystalline microstructure. To develop a fully quantitative characterization procedure, a better understanding of what microstructural features most strongly influence the propagation is needed and how these features appear in the measured, frequency dependent wave speed and attenuation. The equations of motion for elastic wave propagation were examined and systematically a new approximation was developed that is both well characterized and a potential improvement upon existing approximations. One of the objectives is studying the sensitivity of this approximation to changes in microstructural parameterization. DOE

N85-13555# Centro Informazioni Studi Esperienze, Milan (Italy).

QUALIFICATION OF NONINVASIVE SYSTEMS FOR ON-LINE LEAK DETECTION IN HIGH PRESSURE FEED WATER PREHEATERS [QUALIFICAZIONE DI SISTEMI NON-INVASIVI PER LA RIVELAZIONE ON-LINE DI PERDITE IN PRERISCALDATORI D'ACQUA ALIMENTO AD ALTA PRESSIONE]

M. Famiglietti and S. Ghia 1984 28 p refs In ITALIAN; ENGLISH summary Presented at ATI-AIPnD Conv. Scambiatori per il Ciclo Termico Nelle Unita di Potenza ed Industriali Ricerca e Sviluppo Progettazione Costruzione Esercizio Controlli, Segrate Italy, 1 Jun. 1984

(CISE-2341) Avail: NTIS HC A03/MF A01

A monitoring system for tube rupture in high pressure preheaters is presented. An acoustic emission transducer set on the outer part of the component is used for the continuous monitoring of ultrasonic noise caused by turbulent flow from rupture. The results obtained in 3yr of experimental activity in laboratory and in power plants show good performance and reliability of the system. Author (ESA)

N85-13556# Centre Technique des Industries Mecaniques, St. Etienne (France).

MEASUREMENT OF THE PRELOADING OF BOLTED JOINTS BY THE ULTRASONIC METHOD Final Report [MESURE DES PRECHARGES DE SERRAGE DANS LES ASSEMBLAGES BOULONNES PAR METHODE ULTRASONORE]

M. Sorel, J. Aubert, and A. Brand Sep. 1983 254 p refs In FRENCH

(CETIM-1-5H-38-6) Avail: NTIS HC A12/MF A01

The application of ultrasonic measurements to determine bolt preloading is studied. An ultrasonic trasducer is placed in direct contact with the bolt during preloading. A preloading tool with a transducer incorporated is described. It is shown that the chronometric ultrasonic method measures preloading with an accuracy of 5%. Experimental results obtained in full scale industrial application are presented. Author (ESA)

N85-13557# Centre Technique des Industries Mecaniques, Senlis (France).
NOISE IN SMALL PORTABLE MOTOCOMPRESSORS. EXPERIMENTS ON LIMITED-COST ACOUSTIC TREATMENTS TO OBTAIN PROGRESSIVE IMPROVEMENTS Final Report [BRUIT DES PETITS GROUPES MOTO-COMPRESSEURS MOBILES. EXPERIMENTATION DE PLUSIEURS TRAITEMENTS ACOUSTIQUES DE COUT LIMITE ET PERMETTANT DES GAINS PROGRESSIFS]
J. Collober and B. Corlay Apr. 1984 56 p In FRENCH
(CETIM-11-H-445) Avail: NTIS HC A04/MF A01

Design modifications are proposed in order to help motocompressor manufacturers to reduce the noise level to 85 dBA. Work on < 8kW groups shows that the noise sources are, in order of importance, the internal combustion motor exhaust, the air inlet, the cooling air circuit and the oil pan. The effects of an inlet air filter, an exhaust noise attenuator and a cover on the motocompressor are discussed. A noise reduction of 10dBA is obtained.
Author (ESA)

N85-13097# Joint Publications Research Service, Arlington, Va.
REFLECTION OF VOLUME WAVES IN MULTILAYER STRUCTURES Abstract Only
V. K. Razgonyayev and I. B. Yakovkin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 1-2 Transl. into ENGLISH from Akust. Zh. (Moscow), v. 30, no. 1, Jan. - Feb. 1984 p 110-113 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13125# Joint Publications Research Service, Arlington, Va.
PROPAGATION OF ACOUSTIC SHEAR WAVES THROUGH ACTIVE PERIODIC STRUCTURE Abstract Only
A. A. Bulgakov and A. I. Timchenko *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 98 Transl. into ENGLISH from Akust. Zh. (Moscow), v. 30, no. 1, Jan. - Feb. 1984 p 23-27 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13546# Joint Publications Research Service, Arlington, Va.
MEASUREMENT OF INFRASONIC WAVES FROM REMOTELY DETONATED ARTIFICIAL EXPLOSION
Tu Yan and Liu Hongqi *In its* China Rept.: Sci. and Technol. (JPRS-CST-84-001) 16 Jan. 1984 p 8-12 Transl. into ENGLISH from Shengxue Xuebao (Beijing), v. 8, no. 2, Mar. 1983 p 118-121 (For primary document see N85-13545 04-70)
Avail: NTIS HC A03/MF A01

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N85-13558*# Louisiana State Univ., Baton Rouge. Dept. of Physics and Astronomy.
OSCILLATOR STRENGTHS FOR OII IONS Progress Report
Y. K. Ho and J. W. Henry Apr. 1983 17 p refs
(Grant NAGw-48)
(NASA-CR-174153; NAS 1.26:174153) Avail: NTIS HC A02/MF A01 CSCL 20H

Oscillator strengths between various doublet states of OII ions are calculated in which extensive multi-configuration wave functions are used. The lower levels for the transitions are of the 2p(3) D(2)o and 2p(3) 2po states, and the upper levels are 2p(4), 3s, and 3d states. The results, which are estimated to have errors of less than 10% for individual transitions, agree quite well with the beam foil experiments, as well as with the calculations by use of the non-closed shell many electron theory (NCMET). The agreement with the rocket measurements is also good except for the 538/581 A pair, in which the 538 A line is believed to be blend with the other stronger quartet line. However, a comparison with the recent branching ratio measurement indicates that discrepances between the present calculation and the experiment do exist for certain transistions.
Author

N85-13559*# Pennsylvania State Univ., University Park. Dept. of Physics.
VELOCITY-CHANGING COLLISIONAL EFFECTS IN NONLINEAR ATOMIC SPECTROSCOPY AND PHOTON ECHO DECAY IN GASES
R. M. Herman [1983] 15 p refs
(Grant NAG5-303)
(NASA-CR-174159; NAS 1.26:174159) Avail: NTIS HC A02/MF A01 CSCL 20H

A general theory of atomic dipole coherence under the influence of collisional phase changes, inelastic effects and optically active atom velocity changes, including those due to anisotropic interactions is presented. Velocity change effects are obtained in closed form. Line shapes appear as convolutions of standard pressure broadening contours with velocity-change contours. Width and shift parameters for the He-broadened Na D lines at 2 m bar pressure, 380 K are calculated, as are He-induced photon echo decay rates for these lines. Overall agreement with xperiment is reasonably good.
Author

N85-13560*# Washington Univ., St. Louis, Mo. Center for the Space Sciences.
SCINTILLATOR-FIBER CHARGED PARTICLE TRACK-IMAGING DETECTOR
W. R. Binns, M. H. Israel, and J. Klarmann [1983] 28 p refs Submitted for publication
(Grants NAGw-122; NGL-26-008-001)
(NASA-CR-174160; NAS 1.26:174160) Avail: NTIS HC A03/MF A01 CSCL 20H

A scintillator-fiber charged-particle track-imaging detector was developed using a bundle of square cross section plastic scintillator fiber optics, proximity focused onto an image intensified charge injection device (CID) camera. The tracks of charged particle penetrating into the scintillator fiber bundle are projected onto the CID camera and the imaging information is read out in video format. The detector was exposed to beams of 15 MeV protons and relativistic Neon, Manganese, and Gold nuclei and images of their tracks were obtained. Details of the detector technique, properties of the tracks obtained, and preliminary range measurements of 15 MeV protons stopping in the fiber bundle are presented. M.G.

N85-13561# Argonne National Lab., Ill. Materials Science and Technology Div.
EXTENDED X-RAY ABSORPTION FINE STRUCTURE (EXAFS) STUDIES OF THE ACTINIDES
S. K. Chan and G. S. Knapp Jul. 1984 4 p refs Presented at the 3rd Intern. EXAFS Conf., Stanford, Calif., 16-20 Jul. 1984
(Contract W-31-109-eng-38)
(DE84-015833; CONF-840764-2) Avail: NTIS HC A02/MF A01

The basic extended X-ray absorption fine structure (EXAFS) parameters of the backscattering amplitude and phase shift were computed as a function of k for he neutral atoms of Th, U, Np and Pu. It is found that an anomalous variation of the backscattering phase shift with respect to k occurs for the actinide elements at approximately K = 7 A(-1). However, this variation is monotonic, unlike those for Pb and a few other lighter elements. It is also found that the detailed behavior of the parameters is sensitive to the distribution of electrons in the 5f open shell. Comparison with experiments on uranium arsenide and selenide emphasizes the need for careful modeling of the 5f electronic configuration. DOE

N85-13562# Rochester Univ., N. Y.
LOW ENERGY ION-MOLECULE REACTION DYNAMICS AND CHEMIIONIZATION KINETICS Progress Report, 1 Feb. 1982 - 31 Jan. 1985
James M. Farrar 1984 20 p refs
(Contracts DE-AC02-78ER-04694; ER-78-S-02-4694)
(DE84-015881; DOE/ER-04694/1) Avail: NTIS HC A02/MF A01

Low energy crossed ion beam neutral beam studies of a wide spectrum of elementary chemical reactions were performed. The reactive scattering work embodies crossed beam studies of simple chemical processes under single collision conditions which elucidate reaction dynamics by measuring product branching ratios, translational energy distributions and scattering angle distributions. The studies have emphasized the proton transfer reactions of the important flame cations HCO(+) and H3O(+) with a number of neutral molecules present in flames, including H2O, CH3OH, CH3CH2OH, and (CH3)2CO, and a wide variety of reactions of the ground state carbon cation, C(+)((2)P), with neutrals, illustrating the important reactions of insertion into C-H, O-H, N-H, and C-C bonds, as well as condensation reactions in which new C-C bonds are formed, yielding significant increases in the molecular weight of the charged product. These studies represent the first crossed beam studies in which information more detailed than rate constants and energy dependent total cross sections was inferred about the reaction dynamics. DOE

N85-13563# Stanford Linear Accelerator Center, Calif.
ASP: A NEW PEP EXPERIMENT TO MEASURE SINGLE PHOTONS
R. Hollebeek May 1984 5 p refs Presented at the 3rd Intern. Conf. on Instr. for Colliding Beam Phys., Novosibirsk, USSR, 15-21 Mar. 1984
(Contract DE-AC03-76SF-00515)
(DE84-015732; SU-SLAC-Pub-3347; CONF-840396-7) Avail: NTIS HC A02/MF A01

The design and construction of a new experiment for PEP designed to measure the flux of low energy photons unaccompanied by any additional photons, or charged tracks is described. The device consists of arrays of extruded lead glass bars and PWC's in the central region with lead-scintillator shower counters, drift chambers and PWC's in the forward regions. 9 references. DOE

N85-13564# Stanford Linear Accelerator Center, Calif.
CERENKOV RING IMAGING DETECTOR DEVELOPMENT AT SLAC
Stephen H. Williams Jun. 1984 10 p refs Presented at the Intern. Conf. on Instr. for Colliding Beam Phys., Novosibirsk, USSR, 15-21 Mar. 1984
(Contract DE-AC03-76SF-00515)
(DE84-015883; SU-SLAC-Pub-3360; CONF-840396-8) Avail: NTIS HC A02/MF A01

The imaging of Cerenkov light on to photosensitive detectors promises to be a powerful technique for identifying particles in colliding beam spectrometers. Toward this end two and three dimensional imaging photon detectors are being developed at SLAC. The present techniques involve photon conversion using easily ionized exotic chemicals like tetrakisdimethyl-amino-ethylene (TMAE) in a drift and amplifying gas mixture of methane and isobutane. Single photoelectrons from Cerenkov light are currently being drifted 20 cm and a new device under study will be used to study drifting up to 80 cm along a magnetic field. A short description of a large device currently being designed for the SLD spectrometer at the Stanford Linear Collider will be given. DOE

N85-13565# Cornell Univ., Ithaca, N.Y. Materials Science Center.
HYDROGEN ABSORPTION ON (110) TUNGSTEN PLANES AT 30 K: AN ATOM-PROBE FIELD-ION MICROSCOPE STUDY
A. T. Macrander and D. N. Seidman 1984 29 p refs
(Contract DE-AC02-76ER-03158)
(DE84-015659; DOE/ER-03158/T1; Rept-5346) Avail: NTIS HC A03/MF A01

Adsorption of hydrogen on (110) oriented tungsten specimens was studied via field desorption in an atom-probe field-ion microscope. Adsorption was studied on surfaces prepared by field evaporation. Typically, hydrogen field desorption events were exhausted after seven tungsten (110) planes were field evaporated. Exposures were controlled by applying a potential to the specimen which was sufficient to field ionize hydrogen gas molecules appproaching the specimen and which thereby prevented additional hydrogen from being absorbed. An adsorption model which invokes sticking at step sites but not at plane sites is proposed to explain the coverage data. DOE

N85-13566# California Univ., Berkeley. Lawrence Berkeley Lab.
INTENSE NON-RELATIVISTIC CESIUM ION BEAM
Michael Carl Lampel Feb. 1984 141 p refs
(Contract DE-AC03-76SF-00098)
(DE84-012575; LBL-17624) Avail: NTIS HC A07/MF A01

The Heavy Ion Fusion group at Lawrence Berkeley Laboratory has constructed the One Ampere Cesium Injector as a proof of principle source to supply an induction linac with a high charge density and high brightness ion beam. This is studied here. An electron beam probe was developed as the major diagnostic tool for characterizing ion beam space charge. Electron beam probe data inversion is accomplished with the EBEAM code and a parametrically adjusted model radial charge distribution. The longitudinal charge distribution was not derived, although it is possible to do so. The radial charge distribution that is derived reveals an unexpected halo of trapped electrons surrounding the ion beam. A charge fluid theory of the effect of finite electron temperature on the focusing of neutralized ion beams is applied to the problem of the Cesium beam final focus at the end of the injector. The theory's predictions and assumptions are consistent with the experimental data, and accounts for the observed ion beam radius of approx. 5 cm, and the electron halo, including the determination of an electron Debye length of approx. DOE

N85-13567# Sandia Labs., Albuquerque, N. Mex.
IN-LINE BEAM CURRENT MONITOR
C. A. Frost, C. A. Ekdahl, Jr., and C. E. Crist 1984 9 p Presented at the DARPA Propagation Meeting, Monterey, Calif., 18 Jun. 1984
(Contract DE-AC04-76DP-00789)
(DE84-014054; SAND-84-1267C; CONF-8406133-4) Avail: NTIS HC A02/MF A01

A new type of beam current monitor was developed which allows the measurement of the electron beam current in a gas neutralized transport line or at an injection point to a propagation cell. Subnanosecond response is obtained by using a low inductance cavity type current viewing inductor (CVL). In order to measure the beam current in a gas environment, the plasma return current must be blocked. In the new design this is accomplished by solid insulation rather than by a vacuum section. This approach minimizes the beam perturbation due to space charge forces and inductive fields and does not require a separate vacuum section. DOE

N85-13568# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
MATERIALS CHARACTERIZATION USING ION, ELECTRON, AND PHOTON PROBES
A. W. Czanderna May 1984 52 p refs
(Contract DE-AC02-83CH-10093)
(DE84-004518; SERI/TR-255-2217) Avail: NTIS HC A04/MF A01

The content of a lecture at the senior-graduate level on materials characterization using ion, electron, and ion probes is amplified and extensively referenced. The emphasis is compositional surface analysis using secondary ion mass spectroscopy (SIMS), ion scattering spectrometry (ISS), Rutherford backscattering spectrometry (RBS), x-ray photoelectron spectroscopy (XPS), and Auger electron spectroscopy (AES). The physical principles, experimental methods, advantages and limitations, and illustrative examples for each of the five methods are discussed. Composition in depth profiling using sputter ion etching is also described, including mechanisms, yields, rates, instrumentation, advantages, and limitations. Brief comments and literature citations are given for materials characterization using SIMS, ISS, RBS, AES, and XPS in corrosion, surface modification, surface segregration, thin films, and grain boundaries for various materials of interest in industrial materials science and engineering. Extensive references are provided as a guide for those desiring greater depth in the topical areas discussed. DOE

N85-13569# Fermi National Accelerator Lab., Batavia, Ill.
SEARCH FOR NEUTRAL, PENETRATING, METASTABLE

PARTICLES PRODUCED IN THE SLAC BEAM DUMP

J. Bjorken Mar. 1984 13 p refs Presented at the 4th Moriond Workshop on Massive Neutrinos in Particle and Astro-Phys., La Plagne, France, 15-21 Jan. 1984
(Contract DE-AC02-76CH-03000)
(DE84-012468; FERMILAB-CONF-84/33-T; CONF-840150-5) Avail: NTIS HC A02/MF A01

A search was made for neutral objects which might be produced by 20 GeV electrons incident on the SLAC beam dump, penetrate the downstream natural shielding, and decay upstream of an electromagnetic shower calorimeter. With about 30 coulombs of electrons dumped, no candidate events were found above an energy of approx. 2 GeV. Preliminary analysis implies the 95% confidence level limit on the product of mass and lifetime of light axion like bosons decaying primarily into two photons to be greater than 0.8 keV-sec. Preliminary limits on photino parameters are also given. DOE

N85-13570# Washington Univ., Seattle.

QUARK MODELS OF HADRONIC INTERACTIONS

L. Wilets Jan. 1984 21 p refs Presented at Advan. Course in Theoret. Phys. (Hadrons and Heavy Ions), Cape Town, 16 Jan. 1984
(Contract DE-AC06-81ER-40048)
(DE84-013787; DOE/ER-40048/29-N3; CONF-840161-1) Avail: NTIS HC A02/MF A01

The soliton model allows for the dynamical degrees of freedom associated with the confinement mechanism. The soliton model has the flexibility, by choice of the parameters, to reproduce either the MIT or the SLAC bags. With appropriate choice of parameters and inclusion of one gluon exchange, the resulting hadronic spectra is similar to the MIT model. Dynamic processes can be calculated by using techniques developed for nuclear collective motion. This permits calculation of N-N collisions, recoil corrections and the construction of bag states of good momentum. The last is essential for the proper calculation of electromagnetic form factors. The pion is studied in the context of the soliton model. The pion appears as an anomalously light particle, split off and pushed down from the meson multiplet by OGE. The nucleon bag should be soft to qq, virtual excitation with pion quantum numbers. In the soliton model virtual excitations are identified with the pion cloud and pi-nucleon coupling and the weak decay of the pion, (PI) (YIELDS) (MU) + anti nu/sub (MU) are calculated. This description of pion physics begins with a Lagrangian which does not respect chiral invariance and seeks to achieve PCAC from dynamics. In all models, effective fields (sigma or (PI) or both) are introduced to describe degrees of freedom which are too difficult to handle explicitly. DOE

N85-13571# Argonne National Lab., Ill. Radiological and Environmental Research Div.

FUNDAMENTAL MOLECULAR PHYSICS AND CHEMISTRY, PART 1 Annual Report, Oct. 1981 - Dec. 1982

A. F. Stehney and Mitio Inokuti Dec. 1983 111 p refs
(Contract W-31-109-eng-38)
(DE84-009127; ANL-82-65-Pt-1) Avail: NTIS HC A06/MF A01

Scientifically, the work of the program deals with aspects of the physics and chemistry of molecules related to their interactions with photons, electrons, and other external agents. These areas of study were chosen in view of our goals; that is to say, they were chosen so that the eventual outcome of the work meets some of the needs of the US Department of Energy (DOE) and of other government agencies that support the research. First, cross sections for electron and photon interactions with molecules were determined theoretically and experimently, because those cross sections are indispensable for detailed microscopic analyses of the earliest processes of radiation action on any molecular substance, including biological materials. Those analyses in turn provide a sound basis for radiology and radiation dosimetry. Second, the spectroscopy of certain molecules and of small clusters of molecules were studied because this topic is fundamental to the full understanding of atmospheric-pollutant chemistry. DOE

N85-13572# City Univ. of New York Research Foundation, N.Y.

BREMSSTRAHLUNG FROM NUCLEAR SCATTERING AT LOW ENERGY NEAR A RESONANCE

Carroll C. Trail, Peter M. S. Lesser, and Ming Kung Liou Apr. 1984 12 p refs
(Contract DE-AC02-81ER-40023)
(DE84-014852; DOE/ER-40023/2) Avail: NTIS HC A02/MF A01

A program to contribute to the general understanding of nuclear reactions by determining as many of the off-shell properties of the proton-nucleus interaction as possible through the study of the proton-nucleus bremsstrahlung process is discussed. The limits of validity of a model independent analysis of these reactions in the neighborhood of a resonance or a breakup threshold are sought. The differences between this analysis and the data is utilized to elucidate those off-shell constraints which any valid proton-nucleus model interaction must satisfy. The bremsstrahlung process provides a method for determining the off-shell properties of the proton-nucleus potential, and the Brooklyn College program offers a unique opportunity to measure these crucial aspects of the low energy proton-nucleus interaction. DOE

N85-13573# Johns Hopkins Univ., Baltimore, Md.

NUCLEAR MOMENTS AND NUCLEAR STRUCTURE Annual Progress Report, 1 Sep. 1983 - 31 Jul. 1984

Leon Nadansky and Yung Keun Lee 1984 87 p
(Contract DE-AC02-76ER-03472)
(DE84-015847; DOE/ER-02374/5) Avail: NTIS HC A05/MF A01

A copy of a publication that represents the completion of a so called anomalous search, which contemplated the decay into a photon, is presented. The second part of the report discusses the status of Experiment E67OH, a search for direct lepton production using a single arm spectrometer. The experimental arrangements and typical run parameters are discussed. An abstract of a paper describing our earlier work on pion production in central collisions is presented. The analysis of data on (GAMMA)-ray and energetic neutrons from the (MU)(-)-capture in (165)Ho has been completed, and the results are now published. The spectra indicated an enhancement of energetic neutrons and large nuclear excitations, which stimulated new theoretical interpretations. A new experiment was initiated at TRIUMP to study muon capture in light (27)Al and (28)Si. The analysis of the energetic particle emission from the exclusive pion capture reaction in (165)Ho is in its final state, and the interpretation of the spectra in terms of the exciton model is in progress. DOE

N85-13574# Harvard Coll. Observatory, Cambridge, Mass.

THEORETICAL STUDIES OF HIGHLY IONIZED SPECIES Progress Report, 1 Mar. 1982 - 28 Feb. 1985

A. Dalgarno Aug. 1984 16 p refs
(Contract DE-AC02-76ER-02887)
(DE84-016797; DOE/ER-02887/4) Avail: NTIS HC A02/MF A01

The cross sections for charge transfer of multiply charged ions in collision with atomic hydrogen are described and analyzed. Molecular photodissociation and high temperature plasmas are discussed briefly. R.S.F.

N85-13575# California Univ., Livermore. Lawrence Livermore Lab.

ATA GAS PROPAGATION: 1 FOOT TANK EXPERIMENT

Y. P. Chong, G. J. Caporaso, F. W. Chambers, W. M. Fawley, E. J. Lauer, A. C. Paul, D. S. Prono, and J. T. Weir 27 Jun. 1984 5 p refs Presented at the DARPA/Services Propagation Rev., Monterey, Calif., 17-21 Jun. 1984 Submitted for publication
(Contract W-7405-eng-48)
(DE84-016395; UCRL-91394; CONF-8406133-9) Avail: NTIS HC A02/MF A01

The first gas propagation experiment on ATA is planned to be conducted in a 1-foot diameter tank of up to 10 m length. The primary objectives are to measure electron beam parameters at injection to determine whether the desired beam conditioning is achieved, and to observe how such conditioned beams propagate in air and neon. DOE

N85-13576# Stanford Linear Accelerator Center, Calif.
POSITRON FLUX CONCENTRATOR: AN UPDATE
F. Bulos 29 Aug. 1984 22 p refs
(Contract DE-AC03-76SF-00515)
(DE84-016260; SU-SLAC-CN-277) Avail: NTIS HC A02/MF A01

A portions of the concentrator was studied. The objective was to determine the correct parameters which will give the correct field in the central region which captures the maximum number of e(+)'s from the target. Two sections are presented; (1) a simplified model which seems to agree with most of the measurements carried out; and (2) the set up, a typical example of the field's shape and amplitude and the electrical requirements for the final concentrator is described. DOE

N85-13577# Los Alamos Scientific Lab., N. Mex.
LAMPF TRANSMITION-REGION MECHANICAL FABRICATION
E. D. Bush, Jr., J. D. F. Gallegos, R. Harrison, V. E. Hart, W. T. Hunter, S. E. Rislove, and W. J. VanDyke Jul. 1984 52 p refs
(Contract W-7405-eng-36)
(DE84-017078; LA-10136-MS) Avail: NTIS HC A04/MF A01

The primary purpose of the new transition region (TR-II) is to optimize the phase matching of the H(+) and H(-) beams during simultaneous transport. TR-II incorporates several design improvements that include larger aperture, a straight beam track, greater beam-path length adjustments, and utility lines integrated with the support system. The close pack density of magnets and beam-line hardware required innovative solutions to magnet design and mounting, vacuum manifolding, and utility routing. Critical magnet placement was accomplished using a new three-dimensional alignment system that does real-time vector calculations on a computer with input from two digital theodolites. All assembly and a large fraction of the mechanical fabrication were done by LAMPF personnel. The TR-II was operational since September 1983 and routinely transports production beams up to 900-(MU)A current with no major problems. DOE

N85-13578# Los Alamos Scientific Lab., N. Mex.
STOCHASTIC CELL MODEL FOR HADRONIC MULTIPARTICLE DISTRIBUTIONS
P. Carruthers and C. C. Shih (Tennessee Univ., Knoxville) 1984 11 p refs Presented at the 15th Intern. Symp. on Multiparticle Dyn., Lund, Sweden, 11 Jun. 1984
(Contract W-7405-eng-36)
(DE84-016480; LA-UR-84-2505; CONF-8406183-2) Avail: NTIS HC A02/MF A01

Hadronic multiplicity distributions, KNO scaling and deviations therefrom are examined in a fairly general framework with emphasis on the negative binomial distribution. DOE

N85-13579# Brookhaven National Lab., Upton, N. Y.
TUNE SHIFTS FOR COASTING BEAMS CROSSING AT SMALL ANGLES
George Parzen Nov. 1983 17 p ref
(Contract DE-AC02-76CH-00016)
(DE84-017174; BNL-51734) Avail: NTIS HC A02/MF A01

Results are presented for the beam-beam nu-shifts for beams crossing at a small angle (alpha). The beams are not round and have elliptic gaussian charge distributions. The conditions under which the results are valid are discussed. The results include long range effects, and effects of the cut-off of the beam-beam interaction. The theoretical results are compared with those obtained by numerical computation. DOE

N85-13580# Los Alamos Scientific Lab., N. Mex.
FAST NEUTRON CAPTURE WITH A WHITE NEUTRON SOURCE
S. A. Wender and G. F. Auchampaugh 1984 11 p refs Presented at Capture Gamma-Ray Spectry. Conf., Knoxville, Tenn., 10 Sep. 1984
(Contract W-7405-eng-36)
(DE84-016799; LA-UR-84-2711; CONF-840906-1) Avail: NTIS HC A02/MF A01

A system to measure gamma rays following fast neutron reactions was developed. The neutron beam is produced by bombarding a thick tantalum target with the 800 MeV proton beam from the LAMPF accelerator. Incident neutron energies, from 1 to over 200 MeV, are determined by their times of flight over a 7.6-m flight path. The gamma rays are detected in five 7.6 x 7.6 cm cylindrical bismuth germanate (BGO) detectors which span an angular range from 45(0) to 145(0) in the reaction plane. The system measures simultaneously the cross section and angular distribution of gamma rays as a function of neutron energy. The data for the (40)Ca(n,(GAMMA)0) reaction in the region of the giant dipole resonance demonstrate the unique capabilities of this system. Future developments to the neutron source which will enhance the capabilities of the system are presented. DOE

N85-13581# Stanford Linear Accelerator Center, Calif.
PARITY AND TIME-REVERSAL NON-CONVERSATION IN ATOMS
B. W. Lynn (Oxford Univ., England) Aug. 1984 13 p refs Presented at the 9th Intern. Conf. on Atomic Phys., Seattle, 23-27 Jul. 1984
(Contract DE-AC03-76SF-00515)
(DE84-016924; SU-SLAC-PUB-3401; CONF-840786-2) Avail: NTIS HC A02/MF A01

The implications of parity and time-reversal non-conservation are examined for atomic physics. It is concluded that a determination of Q sub W/N to 10% would give an indirect determination of M sub Z competitive with that available from high-energy physics. Limits on the electric dipole moments of neutrons and electrons give non-trivial constraints on model building of CP (charge parity) non-conservation. DOE

N85-13582# California Univ., Livermore. Lawrence Livermore Lab.
PERFORMING (p VECTOR, N), (d VECTOR, n) AND (n VECTOR, n) MEASUREMENTS WITH A ROTATING MAGNET BEAM SWINGER
F. S. Dietrich and T. B. Clegg (North Carolina Univ., Chapel Hill) Aug. 1984 3 p Presented at the Topical Conf. on Neutron-Nucleus Collisions--A Probe of Nucl. Structure, Glouster, Ohio, 5-8 Sep. 1984 Submitted for publication
(Contract W-7405-eng-48)
(DE84-017003; UCRL-91455; CONF-840945-2) Avail: NTIS HC A02/MF A01

Polarized beams of protons and deuterons may be used with a rotating-magnet beam swinger if a spin-precession solenoid is added befoe the swinger to precess the incoming spin axis. DOE

N85-13583# State Univ. of New York, Stony Brook. Dept. of Chemistry.
STABLE ISOTOPE STUDIES Progress Report, 1 Mar. 1984 - 28 Feb. 1985
Takanobu Ishida 25 Aug. 1984 149 p refs
(Contract DE-84016752)
(DE84-016752; DOE/ER-10612/11) Avail: NTIS HC A07/MF A01

The large vapor pressure isotope effect (VPIE) for CH2F2/CD2F2 was elucidated through the Gaussian-70 ab initio molecular orbital calculations using the STO-3G basis set. Results correlate well with all observed carbon and hydrogen VPIE's in liquid methane, methyl fluoride, methylene difluoride and fluoroform. The VPIE measurements of (14)NH3, and (14)ND3 were completed. The triple points were 195.5 K, 195.6 K, and 199.0 K, respectively. The liquid (14)NH3/(14)ND3-pair data compare well with Armstrong but exhibit a systematic discrepancy against the results of Kirshenbaum and Urey. The solid (14)NH3/(14)ND3-pair data compare well with those of Overstreet and Giaugue and extend the lower temperature limit by 10 K. The investigation of (15)N fractionation between liquid mixture of N2O3 and N2O4 and the gaseous oxides in equilibrium with the liquid were completed. A new study of electrocatalytic exchange of hydrogen isotopes was initiated. The concept of zero-th order approximation introduced to the orthogonal expansion of the zero-point energy (ZPE) enabled researchers to assign a value to each valence coordinate as its contribution to the ZPE. The method was applied rigorously for n-alkanes and n-alkyl chlorides. DOE qr

N85-13584# Brookhaven National Lab., Upton, N. Y. Dept. of Physics.

SKYRMIONS AND VECTOR MESONS: A SYMMETRIC APPROACH

D. G. Caldi (Connecticut Univ., Storrs) 1984 27 p refs Presented at a Workshop on Solitons in Nucl. and Elementary Particle Phys., Lewes, Del., 2-16 Jun. 1984
(Contract DE-AC02-76CH-00016; DE-AC02-79ER-10336)
(DE84-015297; BNL-35050; CONF-8406178-1) Avail: NTIS HC A03/MF A01

The effective, low-energy chiral Lagrangian known as the Skyrme model is extended to one formulated by a nonlinear sigma model generalized to include vector mesons in a symmetric way. The model is based on chiral SU(6) x SU(6) symmetry spontaneously broken to static SU(6). The rho and other vector mesons are dormant Goldstone bosons since they are in the same SU(6) multiplet as the pion and other pseudoscalars. Hence the manifold of the generalized nonlinear sigma model is the closet space (SU(6) x SU(6))/Su(6). Relativistic effects, via a spin-dependent mass term, break the static SU(6) and give the vectors a mass. The model can then be fully relativistic and covariant. The lowest-lying Skyrmion in this model is the whole baryonic 56-plet, which splits into the octet and decuplet in the presence of relativistic SU(6)-breaking. Due to the built-in SU(6) and the presence of vector mesons, the model is expected to have better phenomenological results, as well as providing a conceptually more unified picture of mesons and baryons. DOE

N85-13585# Westinghouse Research and Development Center, Pittsburgh, Pa.

INVESTIGATION OF ELECTROMAGNETIC LAUNCHER BEHAVIOR FOR IMPACT FUSION Annual Report, 1 Jul. 1983 - 1 May 1984

Y. C. Thio, W. C. Condit, T. J. Dougherty, D. L. Ometz, N. A. Ottinger, P. L. Ulerich, D. M. York, and J. M. Zomp Jun. 1984 113 p refs
(Contract DE-AC02-83ER-13048)
(DE84-017401; DOE/ER-13048/1) Avail: NTIS HC A06/MF A01

A program to develop an ultrahigh velocity accelerator (SUVAC), based on the electromagnetic railgun accelerator concept and sponsored by the US Department of Energy, has been initiated at Westinghouse R and D Center. The program involves the construction over a 4 year period (July 1983 to June 1987) of a multistage railgun accelerator which has the potential of accelerating a 1-g projectile to about 30 km/s ec (Mach 100). The scientific objective of the program is to use the accelerator so built as the experimental apparatus to investigate the potential technical problems of accelerating macroparticles to velocity presently thought to be required to produce impakct fusion. The program is part of a joint program with the University of Washington to develop the scientific and technological basis to achieve controlled thermonuclear fusion by hypervelocity impact. The progress made in the first year of the program is summarized. It covers work done for the period July 1, 1983 to May 1, 1984. DOE

N85-13586# Los Alamos Scientific Lab., N. Mex.

ACCELERATOR TECHNOLOGY PROGRAM Status Report, Jan. - Sep. 1983

R. A. Jameson, comp. Jul. 1984 90 p
(Contract W-7405-eng-36)
(DE84-017083; LA-10191-SR) Avail: NTIS HC A05/MF A01

Highlights of major projects in the Accelerator Technology Division of the Los Alamos National Laboratory are presented. The first section deals with the Fusion Materials Irradiation Test Facility's 2-MeV accelerator on which tests began in May, as scheduled. Then, activities are reported on beam dynamics, inertial fusion, structure development, the racetrack microtron, the CERN high-energy physics experiment NA-12, and LAMPF II. The Proton Storage Ring is discussed next, with emphasis on the computer control system, diagnostics interfacing, and theoretical support. Other sections summarize progress on a portable radiographic linac, developments on the klystron code, and on permanent magnets. Activities of the Theory and Simulation Group are outlined next, followed by discussion of the oscillator experiment and the energy-recovery experiment in the free electron laser project. The last section reports on the accelerator test stand. DOE

N85-13587# Kanner (Leo) Associates, Redwood City, Calif.

PRELIMINARY GROUPING IN A STRONG-CURRENT LINEAR ION ACCELERATOR WITH A LOW INJECTION ENERGY

V. A. Enalskii, V. V. Osipov, A. P. Fedotov, and B. K. Shembel Aug. 1984 14 p refs Transl. into ENGLISH of "Predvaritelnaia Gruppirovka v Silnotochnom Lineinon Uskoritele Ionov s Nizkoi Energiei Inzhektsii" rept. IFVE-SKU-67-56-K Inst. Fiziki Bysokikh Engrii, USSR, 1967
(Contract W-7405-eng-36)
(DE84-017192; LA-tr-84-32; IFVE-SKU-67-56-K) Avail: NTIS HC A02/MF A01

The results of the numerical calculations show that, in strong-current accelerators with a low injection energy and a large increase in the velocity of the particles on the gaps: (1) the effect of the space charge, with grouping of the particles, may be weakened, to a considerable extent, by the utilization of large grouping voltages. In this case, the coefficient of grouping may exceed the corresponding values, given by the kinematic theory. (2) The spread of the velocities of the grouped particles, increased within certain limits, does not hinder the subsequent effective capture of the latter in a synchronous acceleration mode, because of the expanded region of capture, which is characteristic for a similar accelerator. (3) With small values of the generalized parameter of the space charge (q less than or equal to 0.3), one may, for calculation of the buncher, make use of the results of the kinematic theory with a known approximation. With values of 1 > 0.5, good results are provided by the theory of German and Kompaneets. In the intermediate range, for determination of the optimal drift length and the coefficient of grouping, it is necessary to utilize numerical methods of calculation. DOE

N85-13588# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).

ENERGY TRANSFER IN ATOM-MOLECULE SCATTERING EXPERIMENTS IN THE 1eV REGION WITH SF6-Ar, CF4-Ne AND Xe-CO2 SYSTEMS AS EXAMPLES Thesis [ENERGIEUEBERTRAEGE BEI ATOM-MOLEKUEL-STREUEXPERIMENTEN AM BEISPIEL DER SYSTEME SF6-Ar, CF4-Ne UND Xe-CO2 IM I 1 eV-BEREICH]

E. Piper Nov. 1983 119 p refs In GERMAN
(Rept-11/1983; ISSN-0436-1199) Avail: NTIS HC A06/MF A01

Energy transfer processes in SF6-Ar, CF4-Ne and Xe-CO2 in an energy region of O.5 to 1eV were studied. A modified molecular beam apparatus permitted measurement of differential scattering cross sections and inelastic collisions over a large angular region. Analysis of inelastic collision processes using pseudostatistic time of flight theory is presented. For all three systems the energy transfer is a maximum in a definite angular region of a center of mass frame. Comparison with theory shows the energy transfer of SF6-Ar and CF4-Ne systems is due to rotation and vibration excitation whereas that of the Xe-CO2 system is due to rotation excitation. Author (ESA)

N85-13589# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).

INVESTIGATION ON K (4 2P3/2) Hg INTERACTION AT COLLISION ENERGIES FROM 0.5 TO 5.7 eV Thesis [UNTERSUCHUNG DER K WECHSELWIRKUNG BEI STOSSENERGIEN ZWISCHEN 0.5 UND 5.7 eV]

J. Maier Dec. 1983 21 p refs In GERMAN
(MPIS-15/1983; ISSN-0436-1199) Avail: NTIS HC A02/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 21.15

In an experiment with crossed molecular beams, the total differential scattering cross section was measured for the system K (4 2P3/2) - Hg, the collision energies ranging from 0.5 to 6.8 eV.

The excited potassium atoms were prepared to hyperfine-state with a single-mode oxazine laser. Difference measurements (laser on and off) determined the total differential scattering cross section in the excited state. Using Lennard-Jones potentials, the experimental results can be reproduced by calculation. The average values for the equilibrium distance and the potential energy are given. Author (ESA)

N85-13590# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
ROTATIONAL INELASTIC SCATTERING OF He-ATOMS AT HF-, HCl-, CF4-, SF6-, C2H6- AND C2F6-MOLECULES Thesis [ROTATIONSINELASTIC STREUUNG VON He-ATOMS AN HF-, HCl-, CF4-, SF6-, C2H6- UND C2F6-MOLEKUELEN]
Juergen Frick May 1984 219 p refs In GERMAN
(MPIS-9/1984; ISSN-0436-1199) Avail: NTIS HC A10/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 33.90

The measurement of total differential scattering cross sections and energy loss spectra up to scattering angles of 80 deg for the collision systems He-HCl, -HF, -C2H6, -C2F6, -CF4, -Sf6 and Ne-SF6 is described. The collision energies being 69 to 95 meV, the only inelastic precess is the transfer of rotational energy. The measuring device contains two crossed molecular beams in a vetical-plane configuration and separates single rotational transfers of two-atomic molecules models. Scattering calculations for the two-atomic targets were performed, with the exact close-coupling method. Author (ESA)

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation.*

N85-13591# Los Alamos Scientific Lab., N. Mex.
SPACE NUCLEAR SAFETY PROGRAM Progress Report, Jan. 1984
S. E. Bronisz, comp. Jul. 1984 24 p
(Contract W-7405-eng-36)
(DE84-015983; LA-10162-PR) Avail: NTIS HC A02/MF A01

This technical monthly report covers studies related to the use of PuO2(238) in radioisotope power systems carried out for the Office of Special Nuclear Projects of the US Department of Energy by Los Alamos National Laboratory. Most of the studies discussed here are ongoing. Results and conclusions described may change as the work continues. DOE

N85-13592# Los Alamos Scientific Lab., N. Mex.
GENERAL-PURPOSE HEAT SOURCE DEVELOPMENT: SAFETY TEST PROGRAM. POSTIMPACT EVALUATION, DESIGN ITERATION TEST 2
F. W. Schonfeld and T. G. George Jun. 1984 50 p refs
(Contract W-7405-eng-36)
(DE84-015978; LA-10012-SR) Avail: NTIS HC A03/MF A01

The General-Purpose Heat Source (GPHS) provides power for space missions by transmitting the heat of (238)PuO2 decay to thermoelectric elements. Because of the inevitable return of certain missions, the heat source must be designed and constructed to survive both re-entry and Earth impact. The Design Iteration Test (DIT) series is part of an ongoing test program. In the first Design Iteration Test (DIT-1), a full GPHS module containing four iridium-alloy capsules loaded with (238)PuO2 was impacted at 57 m/s and 930(0)C. All four capsules survived and none was breached. The capsules used in DIT-1 were loaded and welded at Los Alamos. The second Design Iteration Test (DIT-2) also used a full GPHS module and was impacted at 58 m/s and 930(0)C. The four iridium-alloy capsules used in this test were loaded and welded at the Savannah River Plant (SRP). Postimpact examination revealed that two capsules had survived and two capsles had breached; a small quantity (approx. = 50 (MU)g) of (238)PuO2 was released from the breached capsules. Internal cracking similar to that observed in the DIT-1 capsules was evident in all four of the DIT-2 capsules. Postimpact analyses of the units are described with emphasis on weld structure and performance. DOE

N85-13593# Warwick Univ. Coventry (England). Dept. of Engineering.
INSTRUMENTATION AT NATIONAL FACILITIES FOR SYNCHROTRON RADIATION TOPOGRAPHY
D. K. Bowen and J. C. Bilello (State Univ. of New York, Stony Brook) 1983 11 p refs Presented at the Solar Seismology from Space Conf., Snowmass, Colo., 17 Sep. 1983
(Contract DE-FG02-84ER-45098)
(DE84-016256; DOE/ER-45098/3; CONF-8308136-3) Avail: NTIS HC A02/MF A01

The storage ring and the instrumentation characteristics at synchrotron radiation at X-ray facilities are discussed. R.S.F.

74 OPTICS

Includes light phenomena.

N85-13594*# Opcoa, Inc., Santa Ana, Calif.
FIBER OPTIC, FABRY-PEROT HIGH TEMPERATURE SENSOR Final Report
Ken James and Bill Quick Nov. 1984 28 p
(Contract NAS3-23522)
(NASA-CR-174712; NAS 1.26:174712) Avail: NTIS HC A03/MF A01 CSCL 20F

A digital, fiber optic temperature sensor using a variable Fabry-Perot cavity as the sensor element was analyzed, designed, fabricated, and tested. The fiber transmitted cavity reflection spectra is dispersed then converted from an optical signal to electrical information by a charged coupled device (CCD). A microprocessor-based color demodulation system converts the wavelength information to temperature. This general sensor concept not only utilizes an all-optical means of parameter sensing and transmitting, but also exploits microprocessor technology for automated control, calibration, and enhanced performance. The complete temperature sensor system was evaluated in the laboratory. Results show that the Fabry-Perot temperature sensor has good resolution (0.5% of full seale), high accuracy, and potential high temperature (> 1000 C) applications. Author

N85-13595# Los Alamos Scientific Lab., N. Mex.
HIGH-SPEED VIDEOGRAPHY FOR OPTICAL AND X-RAY IMAGING
Lawrence E. Bryant, Jr. 1984 10 p Presented at Am. Soc. of Nondestructive Testing (ASNT) Conf., Denver, 21-22 May 1984
(Contract W-7405-eng-36)
(DE84-012661; LA-UR-84-1419; CONF-8405220-1) Avail: NTIS HC A02/MF A01

The SP-2000 Motion Analysis System, or high speed video (HSV) records up to 2000 full frames per second or up to 12,000 partial (hex) frames per second with a playback speed of 60 frames per second, thus allowing a slow down factor of up to 200 times in the recorded action. The system is quite protable as well as being capable of supporting two cameras simultaneously. The two images, which could be views of the same event from different angles and/or different fields of view or depth of the field, can be viewed on the same TV monitor by use of picture inset techniques with variable size and positioning of the inset. Other useful features of the high speed video system includes a data frame and X and Y reticles that can be activated on replayed images to give accurate position data for any desired frame. DOE

N85-13596# California Univ., Livermore. Lawrence Livermore Lab.
HIGH-BANDWIDTH MULTICHANNEL FIBER OPTIC SYSTEM FOR MEASURING GAMMA RAYS
F. Roeske, D. E. Smith, B. L. Pruett, and R. P. Reedy Jul. 1984 9 p refs Presented at SPIE Ann. Tech. Symp., San Diego, Calif.,

19 Aug. 1984
(Contract W-7405-eng-48)
(DE84-014526; UCRL-90497; CONF-840872-6) Avail: NTIS HC A02/MF A01

An analog fiber optic gamma ray diagnostic system is described that can transmit signals through fiber cables 600 to 700 m long with a system bandwidth exceeding 1 GHz and measure the relative timing between signals to within 0.3 ns ec. Gamma rays are converted to visible light via the Cerenkov process in a short length of a radiation-resistant optical fiber. A graded-index optical fiber transmits this pulse to a recording station where the broadened pulse is compensated for material dispersion and recorded using a streak camera. The streak camera can simultaneously record 20 to 30 data channels on a single piece of film. The system was calibrated using electron linear accelerators and fielded on two experiments. DOE

N85-13597# California Univ., Livermore. Lawrence Livermore Lab.
TIME-RESOLVED TOMOGRAPHIC IMAGES OF A RELATIVISTIC ELECTRON BEAM
H. A. Koehler, B. A. Jacoby, and M. Nelson (EG and G, Inc., Goleta, Calif.) Jul. 1984 9 p refs Presented at the SPIE Ann. Tech. Symp. on Photo-Optical Instrumentation Eng., San Diego, Calif., 19-24 Aug. 1984
(Contract W-7405-eng-48)
(DE84-015021; UCRL-90692; CONF-840872-10) Avail: NTIS HC A02/MF A01

A sequential series of time-resolved tomographic two-dimensional images of a 4.5-MeV, 6-kA, 30-ns electron beam was obtained. Three linear fiber-optic arrays of 30 or 60 fibers each were positioned around the beam axis at 0, 61, and 117 deg. The beam interacting with nitrogen at 20 Torr emitted light that as focused onto the fiber arrays and transmitted to a streak camera where the data were recorded on film. The film was digitized, and two-dimensional images were reconstructed using the maximum-entropy tomographic technique. These images were then combined to produce an ultra-high-speed movie of the electron-beam pulse. DOE

N85-13598# California Univ., Livermore. Lawrence Livermore Lab.
MEASURING TRANSIENT RADIATION EFFECTS IN OPTICAL FIBERS
M. D. Rotter and D. R. Jander Jul. 1984 5 p refs Presented at the SPIE Ann. Tech. Symp., San Diego, Calif., 19 Aug. 1984 Submitted for publication
(Contract W-7405-eng-48)
(DE84-015044; UCRL-90481; CONF-840872-9) Avail: NTIS HC A02/MF A01

A new method for measuring transient radiation effects in optical fibers on a nanosecond timescale was proposed. The method, which is incorporates a streak camera, allows more precise time resolution than other methods and has the advantage of measuring the radiation induced attenuation as a function of wavelength and time simultaneously. By choosing different light sources and sweep speeds, radiation induced attenuation may be measured under a variety of experimental configurations. Examples of the type of output obtained with the method are given. DOE

N85-13599# Los Alamos Scientific Lab., N. Mex.
TOMOGRAPHIC RECONSTRUCTION OF AXIALLY SYMMETRIC OBJECTS FROM A SINGLE RADIOGRAPH
Kenneth M. Hanson Aug. 1984 9 p refs Presented at the 16th Intern. Congr. on High Speed Photography and Photonics, Strasbourg, 27-31 Aug. 1984
(Contract W-7405-eng-36)
(DE84-016783; LA-UR-84-2696; CONF-840887-7) Avail: NTIS HC A02/MF A01

In 1826 Abel presented the method of obtaining the profile of a circularly symmetric 2-D object from its projection. It is shown that the extension of Abel conversion, the reconstruction of a 3-D axially symmetric object from a single radiograph, offers significant benefits as an image analysis tool. These benefits include improved delineation of material boundaries, enhanced display of minor deviations from axial symmetry, as produced by defects, and accurate estimation of the linear attenuation coefficients of the materials. Frequently this technique allows observation of features in the object that are too subtle to be seen in the original radiograph. DOE

N85-13600# Edgerton, Germeshausen and Grier, Inc., Las Vegas, Nev.
APPLICATION OF COMMERCIAL STAR COUPLERS TO INCREASE SIGNAL DYNAMIC RANGE
B. M. Whitcomb, V. N. Smiley, R. L. Flurer, and I. K. Nelson 1984 7 p refs Presented at the SPIE Ann. Tech. Symp., San Diego, Calif., 19 Aug. 1984
(Contract DE-AC08-83NV-10282)
(DE84-014769; EGG-10282-1053; CONF-840872-17) Avail: NTIS HC A02/MF A01

Fused biconical tapered (FBT) fiber optic star couplers were used in a variety of applications at the Nevada Test Site (NTS) in several diagnostic experiments to provide increased dynaic range for the recording devices or to divide the available signal between different recording devices. A number of installation problems are manifested in this application of FBT couplers. The most severe problem results from the modal selection mechanism inherent in the design of FBT couplers. Substantial work was done to characterize a variety of commercial couplers for this application. DOE

N85-13601# Forschungsinstitut der Deutschen Bundespost, Darmstadt (West Germany).
THE SPECTRAL DISTRIBUTION OF FIELD COMPONENTS FOR A SINUSOIDAL POWER MODULATED MONOFREQUENCY OPTICAL CARRIER SOURCE [DIE SPEKTRALE VERTEILUNG VON FELDGROESSEN DER ZEITLICH SINUSFOERMIG MODULIERTEN AUSGANGSLEITUNG EINER MONOFREQUENTEN OPTISCHEN TRAEGERSCHWINGUNGSQUELLE]
Hermann Mahr Feb. 1984 20 p refs In GERMAN; ENGLISH summary
(FI-44-TBr-94) Avail: NTIS HC A02/MF A01

The significance of sidebands produced by power modulation of laser diodes for every field component is estimated for a transmission procedure. An ideal, that is absolute frequency constant pure sinusoidal optical carrier source, was sinusoidal power modulated and the values of the arising side spectral frequencies of the field components are calculated. The resulting square root expression is expanded in a series of harmonic terms, suitable for estimating the modulation effects. The consequences for coherent optical transmission are discussed. Author (ESA)

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N85-13602# Los Alamos Scientific Lab., N. Mex.
PHYSICS OF REVERSED-FIELD PINCH PROFILE SUSTAINMENT
R. W. Moses 1984 22 p refs Presented at the Intern. Conf. on Plasma Phys., Lausanne, Switzerland, 27 Jun. - 3 Jul. 1984
(Contract W-7405-eng-36)
(DE84-014024; LA-UR-84-2023; CONF-840616-19) Avail: NTIS HC A02/MF A01

A description of the Reversed-Field Pinch (RFP) is given, emphasizing the necessity of a magnetohydrodynamic (MHD) or kinetic process to sustain field reversal. Three sustainment mechanisms are reviewed: the MHD dynamo, the tangled discharge model, and nonlocal resistivity. A slap of steady (ohmic) states is described. A relationship between ohmic state wave numbers and the minimum amplitudes of nonsymmetric field components is given. If ohmic states are the sole source of the sustainment process, their wave lengths are probably much longer than the minor diameter of the plasma. Otherwise field asymmetries would exceed those observed in experiments. It is noted that internal field data are still limited, restricting the generality of comments. DOE

N85-13603# Los Alamos Scientific Lab., N. Mex.
THEORETICAL STUDIES OF FIELD-REVERSED CONFIGURATIONS (FRC) AND EXPERIMENTAL STUDY OF THE FRC DURING TRANSLATION
R. E. Siemon, W. T. Armstrong, R. R. Chrien, P. L. Klingner, R. K. Linford, K. F. McKenna, D. J. Rej, J. L. Schwarzmeier, A. Sgro, and E. G. Sherwood Aug. 1984 13 p refs Presented at the 10th Intern. Conf. on Plasma Phys. and Controlled Nucl. Fusion Res., London, 12-19 Sep. 1984
(Contract W-7405-eng-36)
(DE84-016467; LA-UR-84-2690; CONF-840910-13) Avail: NTIS HC A02/MF A01

Theoretical studies of FRC stability and transport are summarized. Finite Larmor radius theories are shown to be unreliable for explaining the experimentally observed stability to tilting. Control of the n=2 rotational instability has been demonstrated in 2-dimensional hybrid-code simulations, and the stability appears to be described within MHD if the nearly square equilibria that result from quadrupole fields are taken into account. Simulations of the lower-hybrid-drift instability in parameter regimes relevant to experiments show good agreement with a nonlocal theory of the instability. A 1.5-dimensional transpot code shows agreement with the energy confinement time but disagreement with the flux loss time observed in FRX-C. The process of FRC translation in which the plasma is formed, translated into a dc solenoid, and trapped by magnetic mirrors has been studied in the FRX-C/T experiment. DOE

N85-13604# California Univ., Livermore. Lawrence Livermore Lab.
THEORETICAL STUDIES IN TANDEM MIRROR PHYSICS
R. H. Cohen, S. P. Auerbach, D. E. Baldwin, J. A. Byers, Y. J. Chen, B. I. Cohen, R. P. Freis, J. M. Gilmore, J. H. Hammer, and T. B. Kaiser 17 Jul. 1984 14 p refs Presented at the 10th Intern. Conf. on Plasma Phys. and Controlled Nucl. Fusion Res., London, 12-19 Sep. 1984
(Contract W-7405-eng-48)
(DE84-015634; UCRL-90412; CONF-840910-3) Avail: NTIS HC A02/MF A01

Recent developments in six areas of tandem-mirror theory are explored. Specifically, FLR terms (including electric-field drift) were added to the 3-D paraxial MHD equilibrium code. The low-frequency MHD stability analysis with FLR, which previously included only m/sub theta/ = 1 rigid perturbations, was extended to incorporate moderate m-sub theta/, rotatonal drive, finite-beta effects on wall stabilization, and the well-digging effect of energetic electrons by using three computational techniques. In addition, the microstability of relativistic electrons with a loss-cone distribution was examined, emphasizing the whistler and cyclotron-maser instabilities. Techniques for controlling radial transport, including the floating of segmented end plates and the tuning of transition-region coils were studied, and the residual transport in a tandem mirror with axisymmetric throttle coils quantified. The transition between the weak- and strong-heating regimes was examined using Fokker-Planck and Monte Carlo codes; an analytic model for the potentials relative to the end wall was developed. DOE

N85-13605# Wisconsin Univ., Madison. Dept. of Physics.
EXPERIMENTAL OBSERVATION OF PLASMA NEOCLASSICAL CURRENTS
M. C. Zarnstorff and S. C. Prager Mar. 1984 16 p refs
(Contract DE-AC02-83ER-53154)
(DE84-015706; DOE/ER-53154/64) Avail: NTIS HC A02/MF A01

Experimental observations of the bootstrap and Pfirsch-Schlueter currents, predicted by neoclassical transport theory, are presented. Detailed measurements of the parallel plasma currents in a toroidal octupole agree, within the separatrix, with theoretical predictions. Observations of the spatial structure, collisionality and toroidal field dependence of the complete current and the ion portion of the current are discussed. DOE

N85-13606# Language Services, Knoxville, Tenn.
THEORY OF RESISTIVE BALLOONING MODES IN TOKAMAKS
A. B. Mikhailovskii, E. I. Yurchenko, and I. V. Kurchatov [1984] 14 p refs Transl. into ENGLISH of rept. IAE-3705/6 I. V. Kurchatov Atomic Energy Inst., Moscow, 1982 13 p Prepared for ORNL, Tenn.
(Contract DE-AC05-84OR-21400)
(DE84-015626; ORNL-tr-5142; IAE-3705/6) Avail: NTIS HC A02/MF A01

A linear theory of resistive ballooning modes in Tokamaks at a high plasma pressure was developed. It was demonstrated that, together with the familiar thresholdless electrostatic mode strongly localized along the radius of the column, there are two other electromagnetic modes that are less localized and may be more hazardous in a real experiment. The stability criteria of these modes were determined and their increments were calculated. It was demonstrated that a rapid resistive threshold ballooning mode can develop in the secondary zone of stability of ideal ballooning modes. DOE

N85-13607# Language Services, Knoxville, Tenn.
INTERNAL HELICAL MODE M = 1 OF A TOKAMAK IN THE PLATEAU AND BANANA REGIMES
A. B. Mikhailovskii, V. S. Tsypin, and I. V. Kurchatov [1984] 17 p refs Transl. into ENGLISH of Preprint IAE-3722/6 I. V. Kurchatov Atomic Energy Inst. and Sukhumi Physico-Technical Inst., Moscow, 1983 16 p Prepared for ORNL
(Contract DE-AC05-84OR-21400)
(DE84-015623; ORNL-tr-5144; IAE-3722/6) Avail: NTIS HC A02/MF A01

The internal helical mode m = 1 of a Tokamak in the plateau and banana regimes was investigated theoretically. It was demonstrated that in the plateau regime the increment of this mode is as small as a/R (a and R are the small and large radii of the torus) as compared with the predicted MHD value. With the transition from the plateau regime to the banana regime the increment increases, approaching the standard MHD value. DOE

N85-13608# Wisconsin Univ., Madison. Dept. of Nuclear Engineering and Physics.
FUSION PLASMA THEORY. TASK 1: MAGNETIC CONFINEMENT FUSION PLASMA THEORY Annual Progress Report, 1 Jan. - 30 Sep. 1984
J. D. Callen Jun. 1984 13 p refs
(Contract DE-AC02-80ER-53104)
(DE84-014941; DOE/ER-53104/8) Avail: NTIS HC A02/MF A01

The research performed over the past nine months has concentrated on some key tandem mirror plasma confinement and heating issues (heating at the second electron cyclotron harmonic, pumping of electrons by ICRF in Phaedrus, pondermotive force effects on MHD stability, moments approach to tandem mirror transport), and on some aspects of Tokamak plasma confinement (long mean free path resistive MHD, Tokapole II equilibria with imbedded coils and internal separatrices, ballooning modes on a divertor separatrix). Progress in these and some other miscellaneous areas are briefly summarized. DOE

N85-13609# Wisconsin Univ., Madison. Dept. of Electrical and Computer Engineering.
FUSION PLASMA THEORY. TASK 3: AUXILIARY HEATING IN TOKAMAKS AND TANDEM MIRRORS
J. E. Scharer Jun. 1984 12 p refs
(Contract DE-AC02-80ER-53104)
(DE84-014940; DOE/ER-53104/10) Avail: NTIS HC A02/MF A01

The ICRF coupling, heating and breakeven studies for Tokamaks and ECRF fundamental second harmonic heating in tandem mirrors are examined. The studies have included ICRF Fokker-Planck heating and breakeven studies for large Tokamaks such as JET, fundamental work on a new wave power absorption and conservation relation for ICRF in inhomogeneous plasmas, a formulation and code development for ICRF waveguide coupling in Tokamak edge regions. The ECRF ray tracing studies were carried out for fundamental and second harmonic propagation, absorption and whistler microinstabilities in tandem mirror plug and barrier regions of Phaedrus, TMX-U and TASKA. The two-dimensional velocity space, time dependent Fokker-Planck heating studies have concentrated on D-T breakeven scenarios for fundamental minority deuterium and second harmonic tritium regimes. DOE

N85-13610# Los Alamos Scientific Lab., N. Mex.

OSCILLATING FIELD CURRENT DRIVE FOR REVERSED FIELD PINCH DISCHARGES

K. F. Schoenberg, R. F. Gribble, and D. A. Baker Jun. 1984 35 p refs
(Contract W-7405-eng-36)
(DE84-015090; LA-9161-MS) Avail: NTIS HC A03/MF A01

Oscillating field current drive (OFCD), also known as F-THETA pumping, is a steady-state current-drive technique proposed for the reversed field pinch (RFP). Unlike other current-drive techniques, which employ high-technology, invasive, and power intensive schemes using radio frequency or neutral particle injection, F-THETA pumping entails driving the toroidal and poloidal magnetic field circuits with low-frequency (audio) oscillating voltage sources. Current drive by this technique is a consequence of the strong nonlinear plasma coupling in the RFP. Because of its low frequency and efficient plasma coupling, F-THETA pumping shows excellent promise as a reactor-relevant current-drive technique. A conceptual and computational study of this concept, including its experimental and reactor relevance, is explored. DOE

N85-13611# California Univ., Livermore. Lawrence Livermore Lab. Physics Dept.

LOCAL FIELDS IN STRONGLY COUPLED PLASMAS

E. L. Pollock and J. C. Weisheit 1984 29 p refs Presented at the 7th Intern. Conf. on Spectral Line Shapes, Aussois, France, 11-15 Jun. 1984
(Contract W-7405-eng-48)
(DE84-013375; UCRL-90902; CONF-8406153-1) Avail: NTIS HC A03/MF A01

Computer simulation techniques and important static properties of plasma microfields are discussed. The relevant timescales are introduced for dynamical atomic problems, and some time dependent properties of microfields are discussed. In the last two sections of the paper these results are applied to two problems relevant to the spectroscopy of dense plasmas: (1) broadening of spectral lines, and (2) screening in inelastic electron ion collisions. DOE

N85-13612# Wisconsin Univ., Madison. Dept. of Nuclear Engineering.

FUSION PLASMA THEORY. TASK 3: ECRH AND TRANSPORT MODELING IN TANDEM MIRRORS AND DIVERTOR PHYSICS

Annual Progress Report, 1 Jan. - 30 Sep. 1984

G. A. Emmert Jun. 1984 16 p refs
(Contract DE-AC02-80ER-53104)
(DE84-014939; DOE/ER-53104/9) Avail: NTIS HC A02/MF A01

The research performed under Tank II of this contact has focused on: (1) the coupling of an ECRH ray tracing and absorption code to a tandem mirror transport code in order to self-consistently model the temporal and spatial evolution of the plasma, and (2) the further development of semi-analytical models for plasma flow in divertors and pumped limiters. Work on these topics is briefly summarized. DOE

N85-13613# Oak Ridge National Lab., Tenn. Fusion Energy Div.

EBT ELECTRON ENERGY CONFINEMENT EXPERIMENTS

J. B. Wilgen, R. K. Richards, D. L. Hillis, D. W. Swain, T. L. White, B. G. Peterson, F. W. Baity, L. A. Berry, W. H. Casson, J. A. Cobble et al 1984 5 p refs Presented at Intern. Conf. on Plasma Phys., Lausanne, Switzerland, 27 Jun. 1984
(Contract DE-AC05-84OR-21400)
(DE84-015402; CONF-840616-20) Avail: NTIS HC A02/MF A01

Plasma parameters as measured in the Elmo Bumpy Torus-S (EBT-S) device are presented together with a description of Electron Cyclotron Heating (ECH) power modulation techniques applied to investigate the confinement properties of the EBT plasma. DOE

N85-13614# Rochester Univ., N. Y. Lab. for Laser Energetics.

BRILLOUIN SCATTERING IN UNDERDENSE UV LASER-PRODUCED PLASMAS

K. Tanaka, B. Boswell, R. S. Craxton, L. M. goldman, M. C. Richardson, W. Seka, R. W. Short, and J. M. Soures Mar. 1984 24 p Presented at the 14th Ann. Anomalous Absorption Conf., Charlottesville, Va., 6-11 May 1984
(Contract DE-AC08-80DP-40124)
(DE84-015184; DOE/DP-40124/39; CONF-8405163-7) Avail: NTIS HC A02/MF A01

UV laser produced plasma interactions in underdense media were studied. Particular attention was addressed to observation of Brillouin scattering and self-focusing. These processes were studied in underdense foam targets whose average density is 0.02 g/cu cm (n sub e approx. = 2n sub. The plasma was produced by a single beam UV laser (GDL) with up to 60 J on target and 800 psec pulse duration. The backscattered light was spectrally resolved and its energy was monitored. An X-ray pinhole camera looked side-on at the plasma around 1 keV, providing some evidence for self-focusing. DOE

N85-13615# Language Services, Knoxville, Tenn.

ROTATION OF A TENUOUS PLASMA WITH A HIGH TOROIDAL VELOCITY IN A TOKAMAK

A. B. Mikhailovskii 1983 7 p refs Transl. into ENGLISH of rept. IAE-3716/7 Inst. of Atomnoy Energii, Moscow, 1983 5 p
(Contract DE-AC05-84OR-21400)
(DE84-012990; ORNL-tr-5127; IAE-3716/7) Avail: NTIS HC A02/MF A01

The question of plasma rotation in a Tokamak is of interest for problems of neoclassical transport and also for instability theory. In recent years, the original inferences of the neoclassical transport theory have been placed in doubt in some papers, for the reason that the influence of poloidal rotation of the plasma on the transport was not taken into account previously. Earlier, the rotation problem in the Pfirsch-Schleuter regime was considered and it was demonstrated that even with an essentially radial electric field, the velocity of poloidal rotation cannot substantially exceed the drift-temperature velocity of the ions. It follows from this that there is no basis for reconsideration of the neoclassical transport theory in the said regime. The problem of plasma rotation in the plateau and banana regimes was examined and it was demonstrated that the velocity of poloidal rotation in these regimes is also of the order of the drift-temperature velocity of the ions and thus is immaterial for transport problems. DOE

N85-13616# California Univ., Livermore. Lawrence Livermore Lab.

INERTIAL CONFINEMENT FUSION: PRESENT STATUS AND FUTURE POTENTIAL

W. J. Hogan 16 Jul. 1984 17 p refs Presented at Intersoc. Energy Conversion Engr. Conf., San Francisco, 19 Aug. 1984
(Contract W-7405-eng-48)
(DE84-016177; UCRL-90733; CONF-840804-33) Avail: NTIS HC A02/MF A01

Power from inertial confinement fusion is discussed. Many of the benefits related to combustion of hydrocarbon fuels and fission power are outlined. Potential problems are identified and put in perspective. The progress toward achieving inertial fusion power is described. Key phenomenological uncertainties are described and experimental goals for the Nova laser system are given. Several ICF reactor designs are discussed. DOE

N85-13617# Department of Energy, Washington, D. C. Office of Fusion Energy.

COMPACT TOROID DEVELOPMENT, ACTIVITY PLAN FOR SPHEROMAKS

Jun. 1984 27 p refs

(DE84-016736; DOE/ER-0198) Avail: NTIS HC A03/MF A01

The description, goals, status, plans, and approach for the investigation of the properties of a magnetic configuration for plasma confinement identified as the spheromak are presented. This component of the magnetic fusion development program is characterized by its potential for physical compactness and a flexible range of output power. The included material represents the second phase of spheromak program planning. It has been deliberately restricted to the experimental and theoretical efforts possible within the present scale of effort. DOE

N85-13618# Columbia Univ., New York.

HIGH-BETA TOKAMAK RESEARCH Annual Progress Report, 1 Aug. 1983 - 30 Jul. 1984

G. A. Navratil Aug. 1984 25 p

(Contract DE-AC02-76ET-53016)

(DE84-016470; DOE/ET-53016/T4) Avail: NTIS HC A02/MF A01

The main research objectives during the past year fell into four areas: (1) construction and initial operation of the new Tokamak, HBT; (2) further numerical modeling of the Torus II experimental equilibria using the PPPL equilibrium and stability codes; (3) diagnostic development; and (4) ICRF antenna coupling calculation in 2D and RF current drive. DOE

N85-13619# Columbia Univ., New York.

HIGH-BETA PLASMA THEORY Annual Progress Report

C. K. Chu and A. Hasegawa Aug. 1984 13 p

(Contract DE-AC02-76ET-53016)

(DE84-016471; DOE/ET-53016/T5) Avail: NTIS HC A02/MF A01

Research activities in plasma physics being conducted by students at Columbia University are presented. Papers delivered and published are listed. R.S.F.

N85-13620# Oak Ridge National Lab., Tenn. Fusion Energy Div.

PROCEEDINGS OF THE US-JAPAN THEORY WORKSHOP ON 3-D MHD STUDIES

B. A. Carreras, ed. May 1984 200 p refs Workshop held at Oak Ridge, Tenn., 19-23 Mar. 1984

(Contract DE-AC05-84OR-21400)

(DE84-012019; CONF-840370; US-Japan-Exchange-J-5) Avail: NTIS HC A10/MF A01

Stellarators, spheromaks, and Tokamak devices are discussed with respect to three dimensional equilibria tearing modes, plasma microinstability, and plasma pinch. R.S.F.

N85-13621# California Univ., Livermore. Lawrence Livermore Lab.

PROGRESS IN INERTIAL CONFINEMENT FUSION AT LAWRENCE LIVERMORE NATIONAL LABORATORY

John F. Holzrichter 26 Aug. 1984 10 p refs Presented at the 10th Intern. Conf. on Plasma Phys. and Controlled Nucl. Fusion Res., London, 12-19 Sep. 1984

(Contract W-7405-eng-48)

(DE84-016227; UCRL-90558; CONF-840910-11) Avail: NTIS HC A02/MF A01

The goals of the Inertial Fusion Program at the Lawrence Livermore National Laboratory are to study matter under extreme conditions of temperature and pressure and to produce fusion energy from inertially confined fusion fuel. With the conclusion of multi-kilojoule 0.53 micron experiments on Novette, vastly improved plasma conditions were demonstrated compared to those previously obtained at LLNL with similar energies at 1.06 microns and elsewhere with 10 micron radiation. The lower preheat environment obtainable with short wavelength light led to 3X improvements in the compression of target on Novette compared to similar targets on Shiva with 1.06 microns. Subsequent experiments on Nova with short wavelength light will begin in 1985. They are expected to demonstrate the necessary compression conditions required for high gain fusion to occur when irradiated with a multi-megajoule driver. These results, together with improved calculations, and innovations in driver and reactor technology, indicate that high gain inertial fusion will occur and is a viable candidate for fusion power production in the future. DOE

N85-13622# Argonne National Lab., Ill. Chemical Technology Div.

BLANKET MATERIALS FOR FUSION REACTORS: COMPARISONS OF THERMOCHEMICAL PERFORMANCE

Carl E. Johnson, Albert K. Fischer, and Marvin Tetenbaum 1984 21 p refs Presented at the Conf. on Thermodyn., Hamilton, Ontario, 13 Aug. 1984

(Contract W-31-109-eng-38)

(DE84-016240; CONF-840807-1) Avail: NTIS HC A02/MF A01

Thermodynamic calculations were made to predict the thermochemical performance of the fusion reactor breeder materials, Li2O, LiAlO2, and Li4SiO4 in the temperature range 900 to 1200 K and in the oxygen activity range 10(-25) to 10(-5). Except for a portion of these ranges, the performance of LiAlO2 is predicted to be better than that of Li2O and Li4SiO4. The protium purge technique for enhancing tritium release is explored for the Li2O system; it appears advantageous at higher temperatures but should be used cautiously at lower temperatures. Oxygen activity is an important variable in these systems and must be considered in executing and interpreting measurements on rates of tritium release, the form of released tritium, diffusion of tritiated species and their identities, retention of tritium in the condensed phase, and solubility of hydrogen isotope gases. DOE

N85-13623# Los Alamos Scientific Lab., N. Mex.

PRELIMINARY USER'S GUIDE FOR BIGONE ON THE CRAY

Charles Snell and Thomas Kwan Jul. 1984 48 p

(Contract W-7405-eng-36)

(DE84-017075; LA-10183-M) Avail: NTIS HC A03/MF A01

BIGONE is an electromagnetic particle-in-cell code used to simulate behavior of a collisionless plasma in one spatial dimension and three velocity components. Unusual features include the ability to treat large systems with general initial and boundary conditions. Extensive diagnostics and analysis capabilities are also provided. The manual summarizes all changes made since the previous CDC-7600 version of the code, defines the Namelist input variables, and gives complete instructions for running the Cray version. DOE

N85-13624# Oak Ridge National Lab., Tenn. Fusion Energy Div.

ZERO-CURRENT, HIGH BETA STELLERATION EQUILIBRIA WITH ROTATIONAL TRANSFORM PROFILE CONTROL

B. A. Carreras, H. R. Hicks, J. A. Holmes, V. E. Lynch, and G. H. Neilson Jul. 1984 29 p refs

(Contract DE-AC05-84OR-21400)

(DE84-016635; ORNL/TM-9182) Avail: NTIS HC A03/MF A01

High beta, zero current equilibria for a stellarator device are calculated using the averaging method. It is found that, by shaping the vertical field, the rotational transform can be controlled in an approximate way as beta is increased. At the same time, the Pfirsch-Schlueter currents are reduced - with no modification of the magnetic well. This permits access to the high beta regime with more favorable rotational transform profiles. Results are presented for the Advanced Toroidal Facility (ATF) device. DOE

N85-13625# Oak Ridge National Lab., Tenn. Computer Sciences.

MONTE CARLO STUDIES OF TRANSPORT IN STELLARATORS

R. H. Fowler, J. A. Rome, and J. F. Lyon Aug. 1984 23 p refs

(Contract DE-AC05-84OR-21400)

(DE84-017633; ORNL/TM-9193) Avail: NTIS HC A02/MF A01

Transport was studied in toroidal geometry by integrating the guiding-center equations in magnetic coordinates and simulating collisions with a Monte Carlo collision operator. The effects of the ambipolar electric field on diffusion losses are determined for model magnetic fields and the correct magnetic field of the Advanced Toroidal Facility (ATF-1) stellarator. Comparisons are made of the computed diffusion coefficients and the theoretically predicted values. DOE

N85-13133# Joint Publications Research Service, Arlington, Va.
MAGNETOHYDRODYNAMIC FLOW OF TWO-COMPONENT GAS ANALYZED
Rong Sheng *In its* China Rept.: Sci. and Technol. (JPRS-CST-84-003) 2 Feb. 1984 p 4-10 refs Transl. into ENGLISH from Lixue Xuebao (Beijing), no. 3, 1983 p 293-297 (For primary document see N85-13132 04-31)
Avail: NTIS HC A03/MF A01

76 SOLID-STATE PHYSICS

Includes superconductivity.
For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

N85-13626# Boston Univ., Mass. Dept. of Physics.
THEORY OF NON-LINEAR INDEX OF REFRACTION OF COMPOUND SEMICONDUCTORS
B. Jensen and A. Torabi 1984 8 p refs Presented at the SPIE Tech. Symp., Arlington, Va., 29 Apr. 1984
(Contract DE-AC02-79ER-10444)
(DE84-013660; DOE/ER-10444/9; CONF-8404124-9) Avail: NTIS HC A02/MF A01

The non-linear index of refraction of a compound semiconductor is calculated below the fundamental absorption edge as a function of incident laser field intensity, frequency and basic material parameters such as band gap energy, effective electron mass, heavy hole mass, spin orbit splitting energy and lattice constant. No adjustable parameters are involved. Theoretical results are obtained from a quantum mechanical calculation of the dielectric constant of a compound semiconductor. Comparison of theory with experimental results for the ternary compound Hg/sub 1-x/Cd/sub x/Te and binary compound InSb is discussed. DOE

N85-13627# Ames Lab., Iowa.
STRONG-COUPLING SUPERCONDUCTIVITY OF Mg IN PROXIMITY TO Ta
E. L. Wolf and D. M. Burnell Aug. 1984 3 p refs Presented at 17th Intern. Conf. on Low Temp. Phys., Karlsruhe, West Germany, 15 Aug. 1984
(Contract W-7405-eng-82)
(DE84-015462; IS-M-507; CONF-840842-23) Avail: NTIS HC A02/MF A01

An energy dependent pair potential (delta sub Mg/ (E) in Mg films, 60 less than or equal d sub N less than or equal 210 A, was observed at 1.3 K through a tunneling study of Ta/Mg-MgO-Ag junctions formed on UHV recrystallized Ta foils. Unequivocal evidence for (delta sub Mg (E) > 0 is provided by observation of the prominent Mg L-phonon peak at 28 mV in the tunneling conductance sigma(V). DOE

N85-13628# Ames Lab., Iowa.
KOHN ANOMALY IN METASTABLE fcc LANTHANUM AT LOW TEMPERATURES
C. Stassis, G. S. Smith, B. N. Harmon, K. M. Ho, and C. Yin Aug. 1984 3 p refs Presented at 17th Intern. Conf. on Low Temp. Phys., Karlsruhe, West Germany, 15 Aug. 1984
(Contract W-7405-eng-82)
(DE84-015459; IS-M-509; CONF-840842-24) Avail: NTIS HC A02/MF A01

Inelastic neutron scattering experiments on a single crystal of the metastable fcc phase of lanthanum metal reveal a pronounced temperature dependent anomaly in the tranverse [111] branch of the phonon dispersion curves. A first principles band structure calculation yields a Fermi surface with a nesting feature along the [111] direction and a peak in the bare susceptability at the same wave vector as the observed experimental anomaly. The calculation differs from previous studies by excluding the 4f states. DOE

N85-13629# Los Alamos Scientific Lab., N. Mex.
IMPROVED APPARATUS AND TECHNIQUES FOR HIGH TEMPERATURE AND PRESSURE DEFORMATION OF CRYSTALLINE MATERIALS
J. J. Kolle and J. D. Blacic Jul. 1984 22 p refs Sponsored by DOE
(DE84-016049; LA-10182-MS) Avail: NTIS HC A02/MF A01

A piston cylinder, solid pressure media deformation apparatus capable of measuring the strength properties of strong crystalline materials is described. The device can generate controlled confining pressures up to 200 MPa, temperatures up to 1300(0)C, axial differential stresses up to 5000 MPa, and variable or constant strain rates over the range 10(-3) to 10(-9) demonstrated to be about + or - 10 MPa. Temperature variation and accuracy are evaluated by a finite element method thermal stress analysis code. Calculated temperature profiles for several high pressure assemblies are compared to experimental calibrations and optimum designs identified. DOE

N85-13630# California Univ., Berkeley.
REPORT OF THE REFERENCE DESIGNS STUDY GROUP ON THE SUPERCONDUCTING SUPER COLLIDER
8 May 1984 443 p refs
(Contract DE-AC03-76SF-00098)
(DE84-015567; DOE/SF-00098/T3) Avail: NTIS HC A19/MF A01

The technical and economic feasibility of various options for creating the superconducting super collider (SSC) facility, a 20 TeV on 20 TeV proton-proton collider having a luminosity up to 10(33) cm(-2)sec(-1) was reviewed. The objective was to decide how best to proceed with SSC R and D directed toward improving the cost effectiveness of applicable accelerator technology. It is found that the basic principles of design used successfully for existing accelerators can be conservatively extended to a proton collider with the SSC primary specifications of energy and luminosity. Each of the three reference magnet styles studied could serve as the foundation for an SSC facility meeting these specifications. A R and D program of approximately 3 years is required to refine the cost estimates for the magnets, to determine their actual performance, to determine their manufacturability and reliability, and to develop cost effective methods for their assembly and quality assurance. It is anticipated that the magnetic options can be narrowed to a single one during an early phase of the R and D program. An important R and D goal will be to produce a significant number of magnets of the chosen style. These magnets will be tested under conditions, which simulate actual accelerator operations. DOE

N85-13631# Sandia Labs., Albuquerque, N. Mex.
PULSED IRRADIATION OF OPTIMIZED, MBE GROWN, AlGaAs/GaAs RADIATION HARDENED PHOTODIODES
J. J. Wiczer, T. A. Fischer, L. R. Dawson, G. C. Osbourn, T. E. Zipperian, and C. E. Barnes 1984 13 p refs
(Contract DE-AC04-76DP-00789)
(DE84-014984; CONF-840712-2-Rev) Avail: NTIS HC A02/MF A01

An AlGaAs/GaAs double heterojunction, mesa isolated, photodiode grown by molecular beam epitaxy was irradiated with 16 MeV electrons, 1 to 10 MeV X-rays, and neutrons from a pulsed reactor. Test results indicate that the AlGaAs/GaAs photodiodes generate approximately 10 to 20 times less photocurrent during exposure to a pulse of ionizing-radiation than radiation hardened silicon PIN photodiodes. Studies of neutron induced permanent damage in the AlGaAs/GaAs photodiode show only small changes in optical responsivity and a factor of 8 increase in leakage currents after exposure to 3.6 x 10(15) neutrons/cm(2) and 900 krad gamma. The silicon PIN photodiode was exposed to only 28% of the fluence used on the AlGaAs photodiodes and a 40% decrease in optical responsivity and a factor of 7000 increase in leakage current were observed. DOE

N85-13632# Arizona State Univ., Tempe. Dept. of Physics.

IMAGING OF SURFACES AND EFFECTS OF CRYSTALS Progress Report, 1 Aug. 1983 - 31 Jul. 1984

J. M. Cowley 1984 24 p refs
(Contract DE-AC02-76ER-02995)
(DE84-016449; DOE/ER-02995/16) Avail: NTIS HC A02/MF A01

The current year was one of major advances in progress towards the development of techniques for the study of surfaces with high spatial resolution. The medium-energy (1-15KeV) REMEDIE system (for Reflection Electron Microscopy and Electron Diffraction at Intermediate Energies) was rebuilt to the stage of showing better than 100A in the transmission mode in good vacuum and was applied to the study of some surface reconstructions on silicon. These instruments include a 300 keV TEM-STEM analtyical electron microscopy from Philips, to be converted for operation under ultra-high vacuum conditions by GATAN Inc. In this a resolution of better than 2.3A and various microanalytical techniques will be applied to surface studies. Also an ultra-high vacuum dedicated STEM instrument is being obtained and this will be modified for the combined application of high resolution STEM imaging, microdiffraction and microanalysis and the surface research techniques of AES, SAM, LEED, UPD and so on. DOE

N85-13633# Los Alamos Scientific Lab., N. Mex.

MAGNETIC SUSCEPTIBILITY, ELECTRICAL RESISTIVITY, AND SPECIFIC HEAT OF SINGLE CRYSTAL LaFe-4P-12

G. P. Meisner, G. R. Stewart, M. S. Torikachvili (California Univ. at San Diego, La Jolla), and M. B. Maple (California Univ., at San Diego, La Jolla) 1984 3 p refs Presented at the 17th Intern. Conf. on Low Temp. Phys., Karlsruhe, West Germany, 15-22 Aug. 1984
(Contracts W-7405-eng-36; DE-AT03-76ER-70227)
(DE84-009979; LA-UR-84-1017; CONF-840842-7) Avail: NTIS HC A02/MF A01

The temperature dependence of the magnetic susceptibility and electrical resistivity, and the low temperature specific heat were measured on single crystals of LaFe4P12. The data confirm both the occurrence of bulk superconductivity at 4.1 K and the absence of any magnetic ordering. LaFe4P12 is a relatively weakly coupled superconductor (lambda = 0.45) and has a density of states at the Fermi energy of 0.98 states/eV-atom. The electrical resistivity exhibits metallic behavior and has a residual resistance ratio of approx. 90. The magnetic susceptibility is very weakly temperature dependent, saturating below 50 K at a value of 0.0008 cu cm/mole. DOE

N85-13634# Sandia Corp., Albuquerque, N. Mex.

GAMMA-INDUCED LEAKAGE IN JUNCTION FIELD-EFFECT TRANSISTORS

D. J. Allen, F. N. Coppage, G. L. Hash, D. K. Holck, and T. F. Wrobel 1984 13 p refs Presented at the 21st IEEE Ann. Conf. on Nucl. and Space Radiation Effects, Colorado Springs, Colo., 22 Jul. 1984
(Contract DE-AC04-76DP-00789)
(DE84-014990; SAND-84-0620C; CONF-840712-9) Avail: NTIS HC A02/MF A01

Junction field-effect transistors are normally considered to be hard to gamma and neutron effects. However, for several types of devices, an increase was measured in the gate to body leakage current which is significant in low-power circuits. Data is presented for two device structures irradiated at three different dose rates; 1E9 rad(Si)/sec, 5.5E2 rad(Si)/sec and 0.9 rad(si)/sec. Parameter measurements on the devices before and after radiation indicate that the leakage results from a surface inversion caused by oxide hole-trapping under the interdigitated source and drain metallization. This conclusion is supported by the time dependent decay in leakage current after radiation and by the lower leakage levels observed on devices that have a highly doped guard-band around the channel diffusion. DOE

N85-13635# California Inst. of Tech., Pasadena. Lab. of Engineering Materials.

EVIDENCE FOR d-BAND CONDUCTION IN METALLIC GLASSES CONTAINING TRANSITION METAL ELEMENTS

R. Schulz and W. L. Johnson Jul. 1984 25 p refs
(Contracts DE-AT03-81ER-10870; DE-AM03-76SF-00767)
(DE84-014822; DOE/ER-10870/152) Avail: NTIS HC A02/MF A01

A discussion is given of the electrical resistivity of amorphous transition metal glasses. Emphasis is based on three specific systems: (Mo0.6Ru0.4) sub 1-x B sub x, Zr sub x Ni sub 1-x and Zr sub x Cu sub 1-x on which large amounts of data, over a wide range of concentrations, can be found in the literature. These systems are characterized by strong scattering and have a conventional mean free path on the order of the interactomic spacing. In this limit, the applicability of the Boltzmann formalism is doubtful. The relationship between the conductivity and the density of states at the Fermi level, coupled with the behavior of the electronic diffusivity across the concentration range, permits to distinguish regions where the d electrons seem to be the main carriers from other regions where the usual s free electrons are responsible for the transport. DOE

N85-13636# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.

STRUCTURE AND PROPERTIES OF GRAIN BOUNDARIES Progress Report, 15 Jul. 1983 - 14 Jul. 1984

R. W. Balluffi and P. D. Bristowe Mar. 1984 16 p refs
(Contract DE-AC02-78ER-05002)
(DE84-014368; DOE/ER-05002/40) Avail: NTIS HC A02/MF A01

Results were obtained in the following areas: determination of relative grain boundary energies by the rotating crystallite method; simple structural unit model for core dependent properties of tilt boundaries; twist boundary energies for metals with long ranged pairwise interatomic potentials; structural unit/grain boundary dislocation model for grain boundary structure; detection of expansion of boundaries using diffraction; effect of secondary relaxations on diffraction from high-(SIGMA) [001] twist boundaries; and mechanism of grain boundary migration. DOE

N85-13637# Sandia Labs., Albuquerque, N. Mex.

ELECTRON AND HOLE EFFECTIVE MASSES FOR TWO-DIMENSIONAL TRANSPORT IN STRAINED-LAYER SUPERLATTICES

G. C. Osbourn 1984 8 p refs Presented at the Intern. Conf. on Superlattices, Microstructures and Microdevices, Champaign-Urbana, Ill., 13 Aug. 1984
(Contract DE-AC04-76DP-00789)
(DE84-016222; SAND-84-0743C; CONF-840877-2) Avail: NTIS HC A02/MF A01

The first theoretical study of the electron and hole effective masses along the layers of (100) strained-layer superlattices grown from direct and indirect gap materials is presented. The results indicate that the large layer strains in these structures can produce electron masses associated with the X valleys and hole masses which are significantly reduced from bulk values. The electron values are typically approx. 0.2 m sub e and the hole values are typically < 0.1 m sub e. These results have important implications for the low field transport properties of strained-layer systems. DOE

N85-13638# Oak Ridge National Lab., Tenn.

FLUX-LINE PINNING BY THE GRAIN BOUNDARY IN NIOBIUM BICRYSTALS

H. R. Kerchner, D. K. Christen, A. Das Gupta, S. T. Sekula, B. C. Cai (Lehigh Univ.), and Y. T. Chou (Lehigh Univ.) Mar. 1984 3 p refs Presented at the 17th Intern. Conf. on Low Temp. Phys., Karlsruhe, West Germany, 15 Aug. 1984
(Contract DE-AC05-84OR-21400)
(DE84-016668; CONF-840842-27) Avail: NTIS HC A02/MF A01

The interaction between the single grain boundary in bicrystals of niobium and the lattice of magnetic flux lines in the superconducting mixed state was investigated by measuring the critical current. Flux lines are found to be pinned at the grain boundary when the two are aligned to within about 1(0). The data imply that both the intrinsic anisotropy of niobium and the electron scattering by the boundary contribute to the pinning. DOE

N85-13639# Argonne National Lab., Ill. Materials Science and Technology Div.
DIFFUSION MECHANISMS AND POINT DEFECTS IN TRANSITION-METAL OXIDES
N. L. Peterson 1984 26 p refs Presented at the Intern. Conf. on Defects in Insulating Crystals, Salt Lake City, 20-24 Aug. 1984
(Contract W-31-109-eng-38)
(DE84-016238; CONF-840883-1) Avail: NTIS HC A03/MF A01

The properties of point defects and the mechanisms of cation diffusion in NiO and Fe2O3 are reviewed. The method of analysis and the results are presented in some detail for NiO to demonstrate how results from measurements of electrical conductivity, deviation from stoichiometry tracer diffusion, and chemical diffusion may be used to obtain concentrations and mobilities of defects. DOE

N85-13640# Sandia Labs., Albuquerque, N. Mex.
SINGLE CRYSTAL SEMICONDUCTOR MULTILAYERS FOR ELECTRICALLY ACTIVE OPTICAL INTERFERENCE FILTERS
P. L. Gourley 1984 7 p refs Presented at the Intern. Conf. on Superlattices, Microstructures and Microdevices, Champaign-Urbana, Ill., 13 Aug. 1984
(Contract DE-AC04-76DP-00789)
(DE84-015614; SAND-84-1647C; CONF-840877-1) Avail: NTIS HC A02/MF A01

Single crystal semiconductor multilayers can be used for electrically active optical interference filters. Potential materials and structures are examined, experimental studies are reviewed, several applications are proposed. DOE

N85-13641# Argonne National Lab., Ill. Materials Science and Technology Div.
STUDY OF THE REACTIVE-ELEMENT EFFECT IN OXIDATION OF Fe-Cr ALLOYS USING TRANSVERSE SECTION ANALYTICAL ELECTRON MICROSCOPY
Wayne E. King, N. L. Peterson, and J. F. Reddy 19 Dec. 1984 7 p refs Presented at the Intern. Conf. on the Struct. and Properties of Internal Interfaces, Irsee, West Germany, 19-23 Aug. 1984
(Contract W-31-109-eng-38)
(DE84-016237; CONF-840884-1) Avail: NTIS HC A02/MF A01

The effect of small (< 1%) additions of Y on the high temperature gaseous oxidation behavior of Fe-24Cr alloys was studied. In the selected oxidation of these alloys at 1000 C leads to the formation of a protective Cr2O2 scale [with a uniform layer of small (200 nm), equiaxed grains at the scale: metal interface], and internal oxidation of the Y2(Fe,Cr)17 precipitates that exist near to the scale: metal interface. These precipitates internally oxidize to form colonies of small (approximately 100 nm) Y2O3 particles. Implications of the present results on proposed models for reduction in scale growth rate and enhanced scale adhesion due to the presence of the reactive-element are discussed. DOE

N85-13642# Oak Ridge National Lab., Tenn. Solid State Div.
ION BEAM AND LASER INDUCED SURFACE MODIFICATIONS
B. R. Appleton Jan. 1984 57 p refs Submitted for publication
(Contracts DE-AC05-84OR-21400; W-7405-eng-26)
(DE84-016569; DOE/OR-21400/T41) Avail: NTIS HC A04/MF A01

The capabilities of energetic ion beam and laser processing of surfaces are reviewed. Ion implantation doping, ion beam mixing, and laser and electron beam processing techniques are capable of producing new and often unique surface properties. The inherent control of these techniques has led to significant advances in our ability to tailor the properties of solids for a wide range of technological applications. Equally important, these techniques have allowed tests of fundamental materials interactions under conditions not heretofore achievable and have resulted in increased understanding of a broad range of materials phenomena. These include new metastable phase formation, rapid nucleation and crystal growth kinetics, amorphous metals and metaglasses, supersaturated solid solutions and substitutional alloys, interface interactions, solute trapping, laser-assisted chemical modifications, and a host of other. DOE

N85-13643# California Univ., Berkeley. Lawrence Berkeley Lab. Engineering and Technical Services Div.
DEVELOPMENT OF HIGH RESPONSITIVITY Ge:Ga PHOTOCONDUCTORS
N. M. Haegel, M. R. Hueschen, and E. E. Haller Jun. 1984 16 p refs Presented at the 3rd Intern. Conf., on Infrared Phys., Zurich, Switzerland, 23-27 Jul. 1984 Submitted for publication
(Contract DE-AC03-76SF-00098)
(DE84-016902; LBL-17032; CONF-840725-7) Avail: NTIS HC A02/MF A01

Czochralski-grown gallium-doped germanium (Ge:Ga) single crystal samples with a compensation of 10(-4) were modified by the indiffusion of Cu to produce photoconductors which provide NEPs comparable to current optimum Ge:Ga detectors, but exhibit responsitivities a factor of 5 to 6 times higher when tested at a background photon flux of 10(8) photons/sec at lambda=93 microns. The introduction of Cu, a triple acceptor in Ge which acts as a neutral scattering center, reduces carrier mobility and extends the breakdown field significantly in this ultra-low compensation material. DOE

N85-13644# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
SURFACE STRUCTURE DETERMINATION WITH ARPEFS
J. J. Barton, S. W. Robey, C. C. Bahr, and D. A. Shirley Aug. 1984 10 p refs Presented at the 1st Intern. Conf. on the Structure of Surfaces (ICSOS), Berkeley, Calif., 13-16 Aug. 1984 Submitted for publication
(Contract DE-AC03-76SF-00098)
(DE84-016904; LBL-18236; CONF-840821-2) Avail: NTIS HC A02/MF A01

A method of surface structure determination based on oscillations in core-level photoemission intensity (angle-resolved photoemission extended fine structure) is described with particular emphasis on the use of Fourier transformation. Qualitative comparisons of Fourier power spectra reveal adsorption sites and shortcomings in theoretical calculations: quantitative backtransformation analysis allows accurate bond lengths and bond angles to be determined. Examples are drawn from these similar atomic adsorption systems: c(2x2)S/Ni(100), p(2x2)S/Cu(100) and c(2x2) S/Ni(110). DOE

N85-13645# California Univ., Livermore. Lawrence Livermore Lab.
CHEMICAL ENGINEERING PRINCIPLES OF CONSTANT TEMPERATURE-CONSTANT SUPERSATURATION GROWTH OF POTASSIUM DIHYDROGEN PHOSPHATE (KDP) CRYSTALS
Yury Zundelevich 23 Aug. 1984 72 p refs
(Contract W-7405-eng-48)
(DE84-017081; UCID-20155) Avail: NTIS HC A04/MF A01

A calculation procedure is developed which relates key process parameters to the rate of growth of individual crystal faces under conditions of constant temperature and oversaturation. The analysis is based on considerations of heat and mass transport, growth kinetics and hydrodynamics, and is applied to the general case of three dimensional growth under mixed kinetic and transport control. It is shown that the maintenance of constant conditions at the crystal surface during extended growth periods requires time dependent control over the rate of feed of solution to the growth chamber. Requirements for heat removal from the chamber (a function of feed rate) can be offset by increases in solute feed concentration and corresponding increases in solution temperature at the inlet to the growth chamber. Optimization of feed rate, temperature, and heat rejection is considered. DOE

N85-13646# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.

EXPERIMENTAL DETERMINATION OF THE CRITICAL CAVITY RADIUS IN Fe-10% Cr FOR ION IRRADIATION

L. L. Horton 1984 2 p Presented at the 42nd Ann. Electron Microscopy Soc. of Am. Meeting, Detroit, 13 Aug. 1984
(Contract DE-AC05-84OR-21400)
(DE84-016570; CONF-840848-6) Avail: NTIS HC A02/MF A01

The value for the critical radius depends on a number of experimental parameters, including the material, dose rate, microstructure, irradiation temperature and gas accumulation. In this investigation, transmission electron microscopy was used to obtain a value for the critical radius for ion bombardments of the ferritic alloy Fe-10% Cr. Microstructural examinations were performed with JEM 120 and JEM 120 CX transmission electron microscopes. DOE

N85-13647# Oak Ridge National Lab., Tenn. Chemistry Div.

COMPUTATIONAL MODELS OF CRYSTALS

William R. Busing 1984 11 p refs Presented at the Intern. Summer School on Crystalographic Computing, Mulheim an der Ruhr, West Germany, 30 Jul. 1984
(Contract DE-AC05-84OR-21400)
(DE84-016631; CONF-84087-1) Avail: NTIS HC A02/MF A01

Two general ways in which computational models of crystals (phenylnapthalenes, diopside) can be used to extend the information available from experiments are discussed. The calculation of intramolecular potentials and the geometry of isolated molecules from observed crystal structures provides knowledge which is presently unavailable from other sources. The extrapolation of crystal structures and properties to high pressures should provide a guide for experiments which are only just beginning to be undertaken. DOE

N85-13648# Mound Lab., Miamisburg, Ohio.

OXYGEN DIFFUSION FROM ANODIC SURFACE OXIDE FILMS ON TITANIUM SUBHYDRIDE STUDIES BY AUGER ELECTRON SPECTROSCOPY AND ELECTRON ENERGY LOSS SPECTROSCOPY

P. S. Wang, T. N. Wittberg (Dayton Univ., Ohio), J. D. Wolf (Dayton Univ., Ohio), and R. G. Keil (Dayton Univ., Ohio) 1984 15 p refs Presented at the 9th Intern. Protechnics Seminar, Colorado Springs, Colo., 6 Aug. 1984
(Contract DE-AC04-76DP-00053)
(DE84-016942; MLM-3183(OP); CONF-840867-4) Avail: NTIS HC A02/MF A01

TiH sub x (0.5 less than x less than 1.7) samples were prepared from titanium foil in order to study the diffusion of oxygen in the titanium subhydride. An anodic oxide, 1000A thick, was grown on the titanium subhydride foils in an agueous saturated solution of ammonium tetraborate. These anodized samples were then heat treated at temperatures between 500 and 600(0)C and changes in the profile of oxygen concentration as a function of depth were monitored using auger electron spectroscopy. From this data then it was possible to calculate the diffusivity of oxygen in the titanium subhydride. It was also found that electron energy loss spectroscopy could be used to determine the titanium subhydride stoichiometry in the near-surface region. This was done by measuring the energy of the bulk plasmon loss peak, which for TiH sub x, varies linearly with hydrogen content. The amount of dehydriding which occurred following a given heat treatment could be determined from profiles of the plasmon loss energy as a function of depth. A sample of anodized TiH0 87 was studied in some detail. Significant dehydriding of this sample for heat treatment times of less than one hour only occured at temperatures above 550(0)C. DOE

N85-13649# Rice Univ., Houston, Tex. Dept. of Physics.

ELECTRON SPIN POLARIZATION EFFECTS IN LOW ENERGY ELECTRON DIFFRACTION, ION NEUTRALIZATION AND METASTABLE ATOM DEEXCITATION AT SOLID SURFACES Progress Report, 1 Jan. - 31 Dec. 1984

1984 11 p refs
(Contract DE-AS05-81ER-10817)
(DE84-016550; DOE/ER-10817/4; PR-4) Avail: NTIS HC A02/MF A01

A GaAs polarized electron source was used to undertake a polarized LEED study of order-disorder transformations at Cu3Au (100) and (111) surfaces. A polarized LEED study of Cu(100) was also initiated. A polarized MDS study of Ni(110) surface magnetism was completed. Spin dependences in the Auger electron yield were observed that provide a measure of the surface magnetism and were used to probe the dependence of surface magnetism on temperature and adsorbate coverage. A similar study using a ferromagnetic glass is now underway. A Mott polarization analyzer, constructed to measure the ESP of the ejected electrons, is also being installed on the apparatus. Such measurements provide direct information concerning the dynamics of secondary electron ejection and the details of adsorbate-substrate bonding. DOE

N85-13650# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.

ON THE ORIGINS OF STRUCTURAL DEFECTS IN BF2(+)-IMPLANTED AND RAPID THERMALLY ANNEALED SILICON: CONDITIONS FOR DEFECT FREE REGROWTH

T. Sands, J. Washburn, E. Myers (North Carolina State Univ., Raleigh), and D. K. Sadana (Microelectronics Center of North Carolina, Research Triangle Park) Jul. 1984 21 p refs Presented at the Ion Beam Modification of Mater. Conf., Ithaca, N.Y., 16-20 Jul. 1984 Submitted for publication
(Contract DE-AC03-76SF-00098)
(DE84-016060; LBL-18045; CONF-840760-9) Avail: NTIS HC A02/MF A01

The rapid thermal annealing behavior of BF2(+)-implanted silicon pre-amorphized with Si(+) and Ge(+) was investigated with conventional and high-resolution cross-sectional transmission electron microscopy, and secondary-ion mass spectrometry. Three distinct layers of defects (types I, II and III) are identified. Fine clusters (type III) in the near-surface regions of both Si(+) and Ge(+) pre-amorphized samples are shown to be related to fluorine. In addition, models for the nucleation of interstitial dislocation loops (type I) and hairpin dislocations (type II) are presented. These models and the experimental results suggest that the densities of type I and type II defects can be reduced by pre-amorphizing with Ge(+) instead of Si(+). Furthermore, defect-free regrowth is demonstrated for samples which are pre-amorphized with Ge(+) and rapid-thermally annealed at 1150 C. DOE

N85-13651# Ames Lab., Iowa.

REAL SPACE SOLUTION TO THE PHASE PROBLEM IN X-RAY CRYSTALLOGRAPHY: ALCAMPS (AMES LABORATORY COMPUTER-AIDED ANALYSIS OF MULTI-SOLUTION PATTERSON SUPERPOSITIONS)

J. W. Richardson, Jr. 1 Aug. 1984 301 p refs
(Contract W-7405-eng-82)
(DE84-015476; IS-T-1097) Avail: NTIS HC A14/MF A01

In 1952, crystal structures could be solved from direct manipulation of the phases of Bragg reflections. Reported here is an ab initio Patterson-based method which requires no prior knowledge about the structure. This method has been automated in the form of a computer program called ALCAMPS. This dissertation deals primarily with the theory and development of Patterson analysis, embodied in ALCAMPs, and its application. A hypothetical two-dimensional structure determination is discussed, followed by a more detailed discussion of ALCAMPS, including many of the statistical tests and calculations which contribute to the accuracy of the results. ALCAMPS has been successfully applied to the solution of sixteen structures to date. Discussions of eight of these structure solutions are included. Fourteen crystal structure determinations have been carried out during the course of this research; of these, four are discussed. The computer program PIKR is also discussed. This program calculates the positions and heights of all peaks in the Patterson or Patterson superposition maps which are used. DOE

N85-13652# AEG-Telefunken, Ulm (West Germany). Fachbereich Technische Roehren.
INVESTIGATION AND DEVELOPMENT OF MULTICOLORED LIQUID CRYSTAL DISPLAY SYSTEMS FOR AUTOMOTIVE DASHBOARD APPLICATION AND LARGE FORMAT INFORMATION BOARDS Final Report, Mar. 1983
Josef Briegel, Kurt Fahrenschon, Robert Ostwald, Gisbert Schubert, Helmut Suessenbach, and Wolfram Wiemer Bonn Bundesministerium fuer Forschung und Technologie Sep. 1984 86 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-84-187; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 18

The manufacturing technology for large area twisted nematic displays with direct and 1:2 multiplex drive was developed. This includes special technologies for integrating the drives IC's into the front glases of the display. The manufacturing procedures were selected to be directly applicable for automated large quantity series production. Negative displays showing bright (colorless or colored) segments on a dark background were investigated. They require tighter production tolerances but show the brighter images required for car dashboards, test equipment, information boards, military equipment, avionic instrumentation, and medical equipment. Author (ESA)

N85-13108# Joint Publications Research Service, Arlington, Va.
LIFETIME OF EXCESS CHARGE CARRIERS IN WEAKLY DOPED EPITAXIAL GaAs LAYERS Abstract Only
B. I. Grigoryev, V. G. Danilchenko, and V. T. Korolkov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 59 Transl. into ENGLISH from Fiz. i Tekhn. (Leningrad), v. 17, no. 11, Nov. 1983 p 1953-1956 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13109# Joint Publications Research Service, Arlington, Va.
NONTHERMAL MECHANISM FOR LASER ANNEALING OF SEMICONDUCTORS AND FORMATION OF SUPER STRUCTURE Abstract Only
V. V. Kapayev, Yu. V. Kopayev, and S. N. Molotkov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 65 Transl. into ENGLISH from Mikroelektron. (Moscow), v. 12, no. 6, Nov. - Dec. 1983 p 499-511 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

N85-13110# Joint Publications Research Service, Arlington, Va.
INVESTIGATION OF EFFECT OF PHOTOCURRENT AMPLIFICATION IN META-DIELECTRIC-SEMICONDUCTOR STRUCTURES BASED ON SILICON Abstract Only
A. P. Nagin, I. O. Nikitin, and V. M. Tyulkin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-010) 28 Aug. 1984 p 66 Transl. into ENGLISH from Mikroelektron. (Moscow), v. 12, no. 6, Nov. - Dec. 1983 p 535-539 (For primary document see N85-13095 04-31)
Avail: NTIS HC A06/MF A01

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

N85-13653# Mound Lab., Miamisburg, Ohio.
THERMITE AND Fe/KClO4: SOME THERMODYNAMIC CALCULATIONS
C. M. Woods 1984 22 p refs Presented at the 9th Intern. Protechnics Seminar, Colorado Springs, Colo., 6 Aug. 1984
(Contract DE-AC04-76DP-00053)
(DE84-016945; MLM-3185(OP); CONF-840867-7) Avail: NTIS HC A02/MF A01

Heats of reaction were calculated for thermite materials consisting of various mixtures of Al, Al/Si, Fe2O3, and Ni. The primary reaction taking place in these thermites was the reduction of iron oxide by aluminum to form metallic iron and aluminum oxide. It was demonstrated that by taking into account all of the favored secondary reactions, the excess thermal output could be accounted for. Adiabatic flame temperatures were calculated. Average heat capacities were calculated for the temperature ranges from ambient to the AFT. Heat capacity calculations were also made in an attempt to understand the relationship between pole temperature and calorific output of various thermite and Fe/KClO4 components. Adiabatic flame temperatures were calculated using, as a closed system, the thermite material and its container. An empirical heat loss was subtracted from the available enthalpy of reaction. The remainder of the available heat was then used to calculate the system reduced adiabatic flame temperature which was termed the pole temperature projection. The results of these calculations were quite good when compared to actual measured values. Necessary heat losses were then calculated in the same fashion to fit the experimentally determined pole temperatures to a reduced AFT. DOE

N85-13654# Brigham Young Univ., Provo, Utah.
THERMODYNAMIC STUDY OF CO2-ORGANIC COMPOUND INTERACTION AT HIGH PRESSURES AND TEMPERATURES Progress Report, 15 Sep. 1982 - 30 Jun. 1984
R. M. Izatt and J. J. Christensen 25 Jul. 1984 13 p
(Contract DE-AC02-82ER-13024)
(DE84-015777; DOE/ER-13024/T1) Avail: NTIS HC A02/MF A01

The energetics of reactions which occur when fluids interact in their supercritical and near-supercritical states are studied. Heat of mixing (H/sup E/) and heat capacity (C/sub p/) data are obtained for selected binary and ternary fluid mixtures using a calorimetric procedure. Calorimeters were constructed. These data are used in the evaluation of thermodynamic models based on equations of state which were modified using appropriate scaling factors. Of particular interest was the successful modeling of binary systems where the critical temperatures of the two components lie close together, in one case (Freon 12 + propane) 15 K apart, and the critical pressures are nearly identical. The modeling was accomplished using H/sup E/ data obtained at temperatures up to 573 K and pressures to 12.7 MPa for binary CO2-X systems where X = decane, hexane, pentane, ethane, toluene, cyclohexane, or pyridine. In addition, several binary Freon-X mixtures were investigated where X = 2,3-dimethylbutane, N,N-dimethylacetamide, propane or ethane. DOE

N85-13655# Oak Ridge National Lab., Tenn.
LINEAR HARMONIC ANALYSIS FOR STIRLING MACHINES AND SECOND LAW ANALYSIS OF FOUR IMPORTANT LOSSES
N. C. J. Chen, F. P. Griffin, and C. D. West 1984 10 p refs Presented at Intersoc. Energy Conversion Eng. Conf., San Francisco, 19 Aug. 1984
(Contract DE-AC05-84OR-21400)
(DE84-016595; CONF-840804-39) Avail: NTIS HC A02/MF A01

A simple thermodynamic theory for Stirling machine performance has been developed. By representing variables in terms of harmonic oscillations and representing the nonharmonic terms in the conservation equations with truncated Fourier series, the equations can be solved in a semi-closed form, leading to a better understanding of Stirling engine behavior. The theory further includes a Second Law analysis; therefore, the efficiency and power losses resulting from effects adiabatic cylinders, transient heat transfer, pressure drop, and seal leakage can be allocated unambiguously, and the degree of loss coupling can be assessed. DOE

N85-13656# Los Alamos Scientific Lab., N. Mex.
AMERICIUM THERMODYNAMIC DATA FOR THE EQ3/6 DATA-

BASE
J. F. Kerrisk Jul. 1984 40 p refs
(Contract W-7405-eng-36)
(DE84-017085; LA-10040-MS) Avail: NTIS HC A03/MF A01

Existing thermodynamic data for aqueous and solid species of americium were reviewed and collected in a form that can be used with the EQ3/6 data base. Data that are important in solubility calculations for americium at a proposed Yucca Mountain nuclear waste repository were emphasized. Conflicting data exist for americium complexes with carbonates. Essentially no data are available for americium solids or complexes at temperatures greater than 25 C. DOE

N85-13657# Oak Ridge National Lab., Tenn.
LINEAR HARMONIC ANALYSIS OF STIRLING ENGINE THERMODYNAMICS
N. C. J. Chen, F. P. Griffin, and C. D. West Aug. 1984 128 p refs
(Contract DE-AC05-84OR-21400)
(DE84-016646; ORNL/CON-155) Avail: NTIS HC A07/MF A01

The analysis involves linearization of the pressure waveform and represents each term in the conservation equations by a truncated Fourier series, including enthalpy flux discontinuity. Second-Law analysis is presented of four inportant loss mechanisms that result from adiabetic cylinders, transient heat transfer in semiadiabatic cylinders, pressure drop through the heat exchangers, and gas leakage from the compression space. The four loss mechanisms, all leading to efficiency reduction below the Carnot level, are characterized by irreversible thermodynamic processes that occur when heat is transferred across a finite temperature difference; when gases at two different temperatures are mixed; or when there is a mass flow through a pressure difference. The allocation of each individual loss mechanism is derived precisely in terms of entropy production but evaluated by use of pressure, temperature, and mass oscillations calculated from the linear harmonic approximation. The theory further shows that the adiabatic effect is more important than the transient heat transfer loss if the gas-to-cylinder heat transfer rate is small. DOE

N85-13658# Florida State Univ., Tallahassee. Dept. of Physics.
A GEOMETRICAL THEORY OF SPIN MOTION
Leopold Halpern (Amsterdam Univ.) 1983 32 p refs
(Contract DE-AS05-76ER-03509)
(DE84-016537; DOE/ER-03509/T2) Avail: NTIS HC A03/MF A01

The fundamental interrelation of geometry and physical laws with Lie groups is discussed, leading to a reformulation and heuristic modification of the principle of inertia and the principle of equivalence. The resulting law of motion allows a unified formulation for structureless and spinning test particles. A metrical theory of gravitation is constructed with the modified principle. It is shown by a reformulation of the energy momentum complex that this version is equivalent to general relativity with a cosmologic term quadratic in the curvature tensor and in which the existence of spinning particle fields is inherent from first principles. The equations of the general theory with torsion are presented. The possibility of verification of the resulting anomalous spin-spin interaction is mentioned and a model imposed by the group topology of SO(3, 2) is outlined. R.S.F.

N85-13659# Physikalisch-Technische Bundesanstalt, Brunswick (West Germany). Abteilung Mechanik.
ON EXPERIMENTAL EQUATIONS OF STATE FOR BOSON GASES [UEBER EXPERIMENTELLE ZUSTANDSGLEICHUNG FUER BOSONENGA]
J. Bortfeldt Mar. 1984 10 p refs In GERMAN
(PTB-Me-61; ISSN-0341-6720) Avail: NTIS HC A02/MF A01

An experimental equation of state for boson gases which satisfies microscopic theory was derived using the virial theorem. The average kinetic energy is taken from the theory of the ideal Bose-Einstein gas; the virial of the average potential energy is considered as a function of density and temperature. By solving a partial inhomogenous differential equation an expression for the pressure, which depends on the potential energy but not on its virial is derived. The coefficients being determined, pressure, internal energy, average kinetic and potential energy, specific isochoric heat capacity and derivable quantities are known. Author (ESA)

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

N85-13660# Committee on Science and Technology (U. S. House).
SUMMARY AND ANALYSIS OF HEARING ON IMPROVING THE RESEARCH INFRASTRUCTURE AT US UNIVERSITIES AND COLLEGES
Michael E. Davey and Karen E. Wieckert Washington GPO Jul. 1984 21 p Rept. presented by the Comm. on Sci. and Technol., 98th Congr., 2nd Sess., Jul. 1984 Prepared by Congressional Research Service, Library of Congress
(GPO-36-854) Avail: Committee on Science and Technology

The current state of research facilities at U.S. universities is reported. The hearing also focused on what role the Federal Government, universities and business play in restoring the university research infrastructure. Some issues focused on were research equipment needs, recruiting a young faculty, graduate students and university industry relations. E.R.

N85-13661# Committee on Science and Technology (U. S. House).
IMPROVING THE RESEARCH INFRASTRUCTURE AT US UNIVERSITIES AND COLLEGES
Washington GPO 1984 142 p Hearing before the Comm. on Sci. and Technol., 98th Congr., 2nd Sess., No. 94, 8 May 1984
(GPO-35-290) Avail: Committee on Science and Technology

Testimony is given on the need for improving the research infrastructure at U.S. colleges and universities. They are encountering severe facility and instrumentation problems. Avenues of funding support for university research infrastructure are delineated and the role the Federal Government should play in that support is explored. R.J.F.

N85-13662*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
THE 1984 NASA/ASEE SUMMER FACULTY FELLOWSHIP PROGRAM Final Report
Bayliss C. McInnis (Houston Univ., University Park, Tex.), Michael B. Duke, and Bob Crow Aug. 1984 57 p
(Grant NGT-44-005-803)
(NASA-TM-87392; NAS 1.15:87392) Avail: NTIS HC A04/MF A01 CSCL 05I

An overview is given of the program management and activities. Participants and research advisors are listed. Abstracts give describe and present results of research assignments performed by 31 fellows either at the Johnson Space Center, at the White Sands test Facility, or at the California Space Institute in La Jolla. Disciplines studied include engineering; biology/life sciences; Earth sciences; chemistry; mathematics/statistics/computer sciences; and physics/astronomy. A.R.H.

N85-13663*# Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.
THE 1984 NASA/ASEE SUMMER FACULTY FELLOWSHIP PROGRAM Final Report
Sep. 1984 90 p refs
(Grant NGT-05-020-412)
(NASA-CR-174138; NAS 1.26:174138) Avail: NTIS HC A05/MF A01 CSCL 05I

The assessment of forest productivity and associated nitrogen flux in a number of conifer ecosystems is described. As a base line study of acid precipitation in the Sierra Nevada, involved is the extraction and integration of a number of data planes describing the terrain, soils, lithology, vegetation cover and structure, and microclimate of the region. The development of automated techniques to extract topographic networks (stream canyons and ridge lines) for use as a landscrape skeleton to organize and integrate data sets into an efficient geographical information system is examined. The software is written in both FORTRAN and C, and is portable to a number of different computer environments with minimal modification. Author

N85-13664*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE 1984 ASEE-NASA SUMMER FACULTY FELLOWSHIP PROGRAM (AERONAUTICS AND RESEARCH) Final Report
Fan Dah-Nien (Howard Univ., Washington, D.C.), Jerry R. Hodge, and Fawzi P. Emad (Maryland Univ., College Park) Sep. 1984 62 p
(Grant NGT-09-011-060)
(NASA-TM-87393; NAS 1.15:87393) Avail: NTIS HC A04/MF A01 CSCL 05I

The 1984 NASA-ASEE Faculty Fellowship Program (SFFP) is reported. The report includes: (1) a list of participants; (2) abstracts of research projects; (3) seminar schedule; (4) evaluation questionnaire; and (5) agenda of visitation by faculty programs committee. Topics discussed include: effects of multiple scattering on laser beam propagation; information management; computer techniques; guidelines for writing user documentation; 30 graphics software; high energy electron and antiproton cosmic rays; high resolution Fourier transform infrared spectrum; average monthly annual zonal and global albedos; laser backscattering from ocean surface; image processing systems; geomorphological mapping; low redshift quasars; application of artificial intelligence to command management systems. E.A.K.

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N85-13665# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
R AND D PROJECT SELECTION WITH NONNUMERICAL RETURNS [SELECAO DE PROJETOS DE P AND D COM RETORNOS NAO-NUMERICOS]
Oscar Pereira Dias, Jr. May 1984 12 p refs In PORTUGUESE; ENGLISH summary Presented at the 16th Simp. Brasileiro ie Pesquisa Operacinal, Florianopolis, Brazil, Oct. 1983
(INPE-2760-PRE/335) Avail: NTIS HC A02/MF A01

The multi-criteria project selection problem subject to linear constraints, with zero-one decision variables (accept or reject kind) is discussed. The project appraisals in each criterium are done using linguistic instead of numeric values, with their meaning represented by fuzzy sets. The computation of the grade of membership of a given alternative, in the fuzzy set of all nondominated alternatives, is made by an algorithm that converges rapidly on the final solution taking very little computer processing time. Author

N85-13666*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PROJECT RESOURCES PLANNING AND CONTROL
Charles W. Sibbers Nov. 1984 145 p refs
(NASA-TM-86339; NAS 1.15:86339) Avail: NTIS HC A07/MF A01 CSCL 05A

This report contains instructional guidelines for the resources planning and control of research and development (R&D) projects managed by NASA's Langley Research Center (LaRC). Although written to serve primarily as a practical guide and reference for those LaRC personnel who perform resources planning, analysis, control, and reporting functions, it should also be meaningful to other NASA personnel who are directly or indirectly involved in or affected by these functions, especially project technical managers whose responsibilities include resources management. Certain sections should help Contractor personnel to better understand what resources information must usually be submitted on LaRC projects and what use is made of such information. The Project Manager of a large R&D project typicaly receives support from an Analyst in the area of resources management. The Analyst provides assistance in four functional areas: Planning, Analysis/Control, Administration, and Reporting. Each of these functions are discussed in detail. Examples of techniques used effectively on LaRC projects have been included where applicable. A considerable amount of information has been included on the use of Performance Measurement (Earned Value) Systems for contract cost control and reporting as little information is currently available on this subject in NASA publications. Author

N85-13667# Technische Univ., Berlin (West Germany).
RESEARCH REPORT 1979-1982. PART 2: PROJECTS [FORSCHUNGSBERICHT 1979-1982. TEIL 2: PROJEKTTEIL]
J. Hoffmann, ed. and M. Wolff, ed. 1982 566 p In GERMAN
(ISBN-3-7983-0960-4) Avail: NTIS HC A24/MF A01

A listing of 1735 projects which were carried out or promoted by the Technical University of Berlin between January 1979 and December 1983 is presented. Author (ESA)

N85-13668# Research Inst. of National Defence, Stockholm (Sweden). Dept. 5.
DYNAMIC DECISION MAKING
Mats Lind, Robert Allard, and Berndt Brehmer Mar. 1984 46 p refs In SWEDISH; ENGLISH summary
(FOA-C-53015-H2; ISSN-0347-7665) Avail: NTIS HC A03/MF A01

A model of dynamic decision making based on control theory is presented, and is contrasted with a general model of static decision making. The importance of having better knowledge of the learning process in dynamic decision making when constructing dynamic situations is stressed. A simulation program for experimental studies is described. Author (ESA)

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

N85-13669 Special Libraries Association, Chicago, Ill. Aerospace Div.
CRISS-CROSS DIRECTORY OF NASA N NUMBERS AND DOD AD NUMBERS, 1962-1978
[1984] 453 p
Avail: Issuing Activity HC $20.00

The Criss Cross Directory is a tabular listing of AD numbers to N numbers. In addition, there are conversion subsets of the NASA report series to N numbers, e.g., NASA CP to N numbers. In addition, there are conversion subsets of the NASA report series to N numbers, e.g., NASA CP to N number, NASA SP to N number, NASA TP to N number, etc. Author

N85-13670*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
FY 1984 SCIENTIFIC AND TECHNICAL REPORTS, ARTICLES, PAPERS AND PRESENTATIONS
Joyce E. Turner, comp. Nov. 1984 68 p
(NASA-TM-86470; NAS 1.15:86470) Avail: NTIS HC A06/MF A01 CSCL 05B

This bibliography lists formal NASA technical reports, papers published in technical journals, and presentations by MSFC personnel. Abstracts are presented for 56 technical memorandum, and 13 technical papers. Six publications, over 260 contractor reports, and more than 300 papers cleared for publication are cited. E.A.K.

N85-13671# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE CHARACTERISTICS OF GENERATION AND THE RATE OF DISTRIBUTION FOR SCIENCE AND TECHNOLOGY INFORMATION IN OUR COUNTRY (CHINA)
Yin Guojin 1 May 1984 12 p Transl. into ENGLISH from Qingbao Kexue (China), v. 4, no. 1, Feb. 1983 p 22-26
(AD-A141037; FTD-ID(RS)T-0436-84) Avail: NTIS HC A02/MF A01 CSCL 05/2

Formation characteristics and rules of domestic information on science and technology in China were examined. More than 470,000 manuscripts, mainly published in recent years, as well as internal information-only documents were analyzed. The distribution characteristics and rules of various disciplines of information were investigated. B.G.

N85-13672# Applied Systems Inst., Inc., Washington, D.C.
AUTOMATED LIBRARY SEARCH SYSTEM (ALSS) USER'S MANUAL
3 Jul. 1984 88 p refs
(Contract DE-AC01-83EP-16046)
(DE84-015952; ASI-1219) Avail: NTIS HC A05/MF A01

The Automated Library Search System (ALSS) is introduced. Its uses are described, its functions explained and detailed information on how to set up and operate the system are provided. The ALSS is a computer-based system for entering, storing, and retrieving information on books, articles, reports, and other documents on the subject of energy vulnerability. Records contained in the system include bibliographic information, status information related to acquisition of the documents, and information which will assist the system manager in determining suitability for release of individual bibliographic records to various system users. Operational capabilities include: a user-friendly interface with the system for data energy and retrieval; retrieval of selected records based on user specification of any one of the following: document index number, author, title, subject matter identifier words/phrases and text work-match; generation of standard hard copy reports or special reports in response to ad hoc inquiry; and positive control by the ALSS System Manager of access to the system by individual users. DOE

N85-13673# Brigham Young Univ., Provo, Utah. Dept. of Economics.
ECONOMIC VALUE OF CONSUMER INFORMATION: A SELECTED, ANNOTATED BIBLIOGRAPHY
R. D. Pope Jul. 1984 154 p Sponsored by Economic Research Service
(PB84-235795; AGES-840312) Avail: NTIS HC A08/MF A01 CSCL 05B

This annotated bibliography contains references on the economic value of information. The citations are listed under three topic areas: consumer surplus and welfare theory, stabilization and economic welfare, and information and efficiency. With a few exceptions, books and lengthy reports are not annotated. GRA

N85-13674# Los Alamos Scientific Lab., N. Mex.
INFORM SYSTEM 2-YEAR PLAN, FY 1984-1985
Jul. 1984 57 p ref
(Contract W-7405-eng-36)
(DE84-016044; LA-10185-MS) Avail: NTIS HC A04/MF A01

An implementation plan for the Information Management (INFORM) System of the Los Alamos National Laboratory for Fiscal Years 1984 and 1985 is described. Subjects discussed include system goals, planning considerations, organization, supporting facilities, projects, critical issues, and customer support. DOE

N85-13675# Pacific Northwest Lab., Richland, Wash.
EXECUTIVE INFORMATION SYSTEM
M. Vitullo, C. Winter, and D. R. Johnson Jul. 1984 96 p
(Contract DE-AC06-76RL-01830)
(DE84-015355; PNL-5190) Avail: NTIS HC A05/MF A01

The Executive Information System (EIS) is a computer-based information handling system. The system was designed and implemented for energy conversion and utilization technologies to allow program managers easy access and tracking of certain types of reporting at various levels of management interaction, to simplify the handling of program-related data, and to streamline the preparation of reporting documents and responses to requests for information from the program. The EIS is especially useful in assisting DOE program managers in the routine dissemination of reports and information. The characteristics of each component of the EIS are discussed. A user's guide to the EIS is included. DOE

N85-13676# California Univ., Livermore. Lawrence Livermore Lab.
INTERNATIONAL INFORMATION NETWORKS FOR MATERIAL PROPERTIES
Viktor E. Hampel, Carol A. Gaynor, Bruce E. Hegemann, Robert D. Sanner, and Y. Wolman (Hebrew Univ. of Jerusalem, Israel) Jun. 1984 64 p ref Presented at the 9th Intern. CODATA Conf., Jerusalem, Israel, 24-28 Jun. 1984
(Contract W-7405-eng-48)
(DE84-013836; UCRL-90942; CONF-8406139-2) Avail: NTIS HC A04/MF A01

By projecting tables and graphs from a CRT computer terminal on a large screen in the main auditorium of the Israel Academy of Sciences and Humanities, attendees of the plenary session viewed interactive retrievals of physical and chemical data derived from seven online information systems and heard corresponding explanations for: CAS ONLINE and NBS/OSRD in the United States, CRYSTMET and F*A*C*T in Canada, DARC in France, DECHEMA in West Germany, and FMDB in Japan. This audio-visual demonstration was carried out over international packet-switching networks and regular telephone voice communications. In two cases, the information resources were accessed and narrated by experts from their offices in the United States and Canada for the attendees of the conference in Jerusalem. A highlight of the demonstration was the searching of a bibliographic database in Paris and the machine-aided translation of a sample of its French text into English. DOE

N85-13677# Hawaii Univ., Honolulu. Inst. of Geophysics.
ARCHIVING AND EXCHANGE OF A COMPUTERIZED MARINE SEISMIC DATABASE: THE ROSE DATA ARCHIVE SYSTEM
S. L. LaTraille Dec. 1983 145 p refs
(DE84-901453; HIG-83-3) Avail: NTIS HC A07/MF A01

A central data exchange facility was organized at Hawaii Institute of Geophysics to manage seismic data collected during the Rivera Ocean Seismic Experiment off the western coast of Mexico. Prior to that experiment, wide consultation was made and much effort was expended in the establishment of a uniform, yet flexible, data exchange format. The participating institutions provided their data to the facility where the data were cataloged and distributed. The processes and computer programs used to catalog, store and distribute the ROSE seismic data are described. DOE

N85-13678# California Univ., Livermore. Lawrence Livermore Lab.
NUCLEAR CRITICALITY INFORMATION SYSTEM: DATABASE EXAMPLES
Carol Ann Foret Jun. 1984 54 p
(Contract W-7405-eng-48)
(DE84-014462; UCID-20103) Avail: NTIS HC A04/MF A01

A guide for the Nuclear Criticality Information System (NCIS) is discussed. It is comprised of an introduction, and information and resources section, a how to use section, and several useful appendices. A clear picture of the NCIS project and its available resources, information to assist the users in accessing the data base and for the TIS computer to process data is discused. The NCIS project, the Technology Information System (TIS), online user information, future plans is described and individuals to contact for additional information about the NCIS project are listed. The information and resources section outlines the NCIS data base and describes the available resources. The how to use section illustrates access to the NCIS database and searching data files for general or specific data. It shows how to access and read the

NCIS news section as and connecting to other information centers through the TIS computer. DOE

N85-13679# Sandia Labs., Albuquerque, N. Mex.
WRITE WHILE YOU WORK: PAINLESS TECHNICAL WRITING FOR SANDIA ENGINEERS
L. S. Lopez Jun. 1984 14 p refs
(Contract DE-AC04-76DP-00789)
(DE84-010869; SAND-84-0729) Avail: NTIS HC A02/MF A01

Writing an engineering report need not be burdensome. If the engineer writes at the same time that he is working, the report will be finished at the same time as the task. And writing while he works will help him define his task and improve the results. DOE

N85-13680# New Mexico Univ., Albuquerque. Energy Research and Development Inst.
ENERGY INFORMATION EXCHANGE, 1983 Final Report
A. Hyder Jun. 1984 40 p refs
(DE84-901446; NMERDI-2-72-4104) Avail: NTIS HC A03/MF A01

The New Mexico Energy Publications Council, with funding from the New Mexico Energy Research and Development Institute, sponsored Energy Information Exchange 1983, a working conference for energy information professionals in the state. At the day-long conference, changing trends in information activities, stemming from factors such as the commercialization of energy R and D, and emerging economic goals were addressed. The conference was attended by 83 registered participants, representing energy information organizations and users of energy information throughout the state. Twenty-five of the attendees participated in the program, giving presentations or chairing workshops. The morning session, Information Resources in New Mexico, was made up of presentations by individuals representing the following information-user groups: state government; municpal government; utilities; tribal government; medial Cooperative Extension Service; federal government; industry; and education. The afternoon session Information Skills, consisted of a series of workshops geared to provide basic knowledge and related experience in: Data Bases, Developing Workshops, Developing Publications, Information Dissemination, and Energy Information and the Media. DOE

N85-13681# Technical Research Centre of Finland, Espoo.
[ACTIVITIES REPORT IN TECHNOLOGY] Annual Report, 1983
1983 36 p Original report contains color illustrations
(ISBN-951-38-1998-1; ISSN-0358-1861) Avail: NTIS HC A03/MF A01

Energy, information, chemical, mechanical, building, urban, and safety technology is discussed. Peat pelletization, nuclear fuel behavior, and thermal insulation of buildings were studied. A satellite network for locating ships/aircraft in distress; a small IR analyzer; and a digital analysis system for pictures of cardiac arteries are described. Use of cellulases in brewing; optimization of bread baking; plastics in tribology; acoustic emission inspection of composites; and peat and wood liquefaction are considered. Dezincification resistant brass for gravity diecasting; CAD color fabric design; CAD/CAM in construction; and safety analyses are summarized. Author (ESA)

N85-13682# Office National d'Etudes et de Recherches Aerospatiales, Paris (France). Direction de l'Aerodynamique.
FIRST CRYOGENIC TEST OF THE CAST 7 PROFILE IN THE T2 WIND TUNNEL. COMPARISON WITH CALCULATIONS [PREMIERS ESSAIS CRYOGENIQUES DU PROFIL CAST 7 A LA SOUFFLERIE T2. COMPARAISONS AVEC LES CALCULS]
A. Mignosi and R. Imbert Apr. 1984 66 p refs In FRENCH
(Contract DRET-83-34-135)
(ONERA-RTS-58/1685-AY-035-D) Avail: NTIS HC A04/MF A01

The influence of the Reynolds number at 0.76 M was studied in natural and enhanced transition using a CAST 7 airfoil profile with 150 mm cord. The wind tunnel and the experimental technique are described. Studies on wall choice and on the thermal equilibrium of the model are included. Computations solving the transonic potential equation with inclusion of viscous effects are presented. Important differences between experiment and theory are observed. Author (ESA)

N85-13683# Societe Nationale Industrielle Aerospatiale, Toulouse (France).
AN ELECTRONIC DOCUMENTATION SYSTEM [UN SYSTEME DE DOCUMENTATION ELECTRONIQUE]
Y. Calderara, C. Chrisment (CERFIA, Toulouse), J. B. Crampes (CERFIA, Toulouse), and G. Zurfluh (CERFIA, Toulouse) 1984 12 p refs In FRENCH Presented At Conv. Informatique 84, 20 Sep. 1984
(SNIAS-842-111-101) Avail: NTIS HC A02/MF A01

An electronic document processing application in aeronautics is discussed. The documents to be recorded in computer systems are studied, classifying content by structure, presentation and information transmitted. The production of technical documentation for the aeronautical industry is described. The application to the production of a maintenance manual is presented. Author (ESA)

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

N85-13684# Centre National d'Etudes Spatiales, Toulouse (France). Direction des Affaires Internationales et Industrielles.
VALUE ANALYSIS [L'ANALYSE DE LA VALEUR]
Claude Petitdemange Jan. 1984 110 p refs In FRENCH; ENGLISH summary
(CNES-NT-110) Avail: NTIS HC A06/MF A01

Industrial competitiveness is analyzed to establish value analysis techniques as a fundamental tool. Product development, user requirements, and cost analysis are discussed. Organization necessary for the implementation of value analysis in the industrial environment is detailed. Author (ESA)

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N85-13685# Committee on Science and Technology (U. S. House).
THE UNIFORM SCIENCE AND TECHNOLOGY RESEARCH AND DEVELOPMENT UTILIZATION ACT
Washington GPO 1984 199 p refs Hearings on H. R. 5002 before the Subcomm. on Sci., Res. and Technol. of the Comm. on Sci. and Technol., 98th Congr., 2nd Sess., No. 86, 15-16 May 1984
(GPO-36-327) Avail: Subcommittee on Science, Research and Technology

Legislative hearings on H.R. 5003 which attempts to devise a more effective and consistent federal patent policy are reported. Getting the maximum benefit for the American taxpayer from his tax dollars spent on research and development is an over riding concern. The modification of patent ownership patterns to push products based on government research into domestic markets and to improve the balance of trade is another concern. The hearings critically review what now exists in technology utilization programs to save work in those programs and to upgrade the rest. E.R.

N85-13686# Committee on Science and Technology (U. S. House).
UNIFORM SCIENCE AND TECHNOLOGY RESEARCH AND DEVELOPMENT UTILIZATION ACT
1984 54 p Rept. to accompany H. R. 5003 presented by the Comm. on Sci. and Technol., 98th Congr., 2nd Sess., 15 Aug. 1984
(H-Rept-98-983-Pt-1; GPO-37-587) Avail: US Capitol, House Document Room

The Committee on Science and Technology has amended and recommended for passage the bill (H.R. 5003) which establishes a uniform Federal system for management, protection, and utilization of the results of federally sponsored scientific and technological research and development. The policy, implementation, allocation of rights, and certain miscellanea of the bill are considered. Also included are cost estimates from the Congressional Budget Office. E.R.

N85-13687# Committee on Science and Technology (U. S. House).
COMPUTER LITERACY ACT OF 1983, PART 2
Washington GPO 1984 16 p Rept. to accompany H. R. 3750 presented by the Comm. on Sci. and Technol., 98th Congr., 2nd Sess., 15 Aug. 1984
(H-Rept-98-752-Pt-2; GPO-37-586) Avail: US Capitol, House Document Room

A favorable report was given to a bill promoting the use of computer technologies in schools to facilitate student and teacher use of computers and to study and enhance the educational uses of computer technologies. The bill addresses these priorities by authorizing: (1) grants to local school districts particularly in poor areas, to purchase computers; (2) teacher training institutes to acquaint teachers to computer use; and (3) a grants program for evaluation and dissemination of information on educational computer hardware and software, as well as basic research into computer models of instruction. A Congressional Budget Office cost estimate is included. A.R.H.

N85-13688# Committee on Science and Technology (U. S. House).
MANUFACTURING SCIENCES AND ROBOTICS RESEARCH AND DEVELOPMENT ACT OF 1984
1984 18 p Rept. to accompany S. 1286 presented by the Comm. on Sci. and Technol., 98th Congr., 2nd Sess., 25 Sep. 1984
(H-Rept-98-1078; GPO-31-006) Avail: US Capitol, House Document Room

Computer aided design; automated materials handling, processing, and assembly; automatic testing; machine adaptive learning; integrated manufacturing systems; machine and process control strategies; automated sensing machines; new metallurgical technology; practices and activities to implement improved manufacturing methods are considered. B.G.

N85-13689*# National Aeronautics and Space Administration, Washington, D. C.
INTERNATIONAL COMPARATIVE STUDY OF SYSTEMS FOR THE GOVERNMENT ADVANCEMENT OF RESEARCH AND DEVELOPMENT
M. Ripke and R. Foerst Oct. 1984 298 p Transl. into ENGLISH of "International Vergleichende Untersuchung zu Verfahrensfragen bei der Staatlichen Forderung von Forschung und Entwicklung" rept. PLI-1268-1 Bundesministerium fuer Forschung und Technologie, Bonn, Nov. 1983 p 1-157 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-77589; NAS 1.15:77589; PLI-1268-1) Avail: NTIS HC A13/MF A01 CSCL 05D

The reorganization, structure and instruments of government advancement of research in three countries was compared: France, Sweden and the USA. In France the powers are centralized; in Sweden and the USA, decentralized. Assistance to projects is provided with grants and contracts in all three countries. France and Sweden also give loans with conditional waiving of reimbursement in case of failure. In all three countries indirect assistance is provided only with small tax breaks. E.A.K.

N85-13690# Committee on Commerce, Science, and Transportation (U. S. Senate).
COMMERCIAL SPACE LAUNCH ACT
Washington GPO 1984 72 p Hearing on S. 2931 before the Subcomm. on Sci., Technol. and Space of the Comm. on Com., Sci. and Transportation, 98th Congr., 1st Sess., 6 Sep. 1984
(GPO-39-613) Avail: Subcommittee on Science, Technology and Space

Several initiatives designed to develop the commercial potential of space through increased private sector investments and involvement are considered. The primary focus is on 2931 which seeks to facilitate private sector space launch activity by establishing the Department of Transportation as the lead Federal agency with licensing authority over private expandable launch vehicle operations and by providing a framework within which this new industry can most effectively operate. Economic, regulatory, and legal incentives are covered as well as NASA support for commercial space ventures. A.R.H.

N85-13691# Committee on Science and Technology (U. S. House).
INTERNATIONAL GEOSPHERE/BIOSPHERE PROGRAM: 1984
Washington GPO 1984 87 p refs Hearings before the Subcomm. on Space Sci. and Appl. of the Comm. on Sci. and Technol., 98th Congr., 2d Sess., no. 118, 12-13 Sep. 1984
(GPO-39-222) Avail: Subcommittee on Space Science and Applications

A strategy is discussed for a multidisciplinary, international program that would take a comprehensive look at Sun-Earth interactions and global habitability. The International Geosphere/Biosphere Program would be the means by which other global international research programs interact. Areas of research would focus on: (1) the fluid subsystem, comprising physical aspects of the atmosphere, ocean, and cryosphere; (2) biogeochemical cycles, comprising the chemical and biological aspects of the entire planet; and (3) the solid Earth system including processes which shape the surface of the Earth and the distribution of minerals, as well as information on past climatic regimes. The core of the program in the U.S. would focus around NASA, NOAA, and NSF. A.R.H.

N85-13311# International Scientific Radio Union, Brussels (Belgium).
INTERNATIONAL COORDINATION IN SCIENTIFIC RESEARCH
C. M. Minnis *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 49-57 (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

N85-13692*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
OVERVIEW OF WASTE HEAT UTILIZATION SYSTEMS
M. Murray Bailey 1984 12 p refs Presented at the 22nd Automotive Technol. Development Contractors' Coordination Meeting, Dearborn, Mich., 29 Oct. 1 Nov. 1984; sponsored by DOE
(NASA-TM-86901; DOE/NASA/50194-41; NAS 1.15:86901) Avail: NTIS HC A02/MF A01 CSCL 10B

The heavy truck diesel engine rejects a significant fraction of its fuel energy in the form of waste heat. Historically, the Department of Energy has supported technology efforts for utilization of the diesel exhaust heat. Specifically, the Turbocompound and the Organic Rankine Cycle System (ORCS) have demonstrated that meaningful improvements in highway fuel economy can be realized through waste heat utilization. For heat recovery from the high temperature exhaust of future adiabatic diesel engines, the DOE/NASA are investigating a variety of alternatives based on the Rankine, Brayton, and Stirling power cycles. Initial screening results indicate that systems of this type offer a fuel savings advantage over the turbocompound system. Capital and maintenance cost projections, however, indicate that the alternative power cycles are not competitive on an economic payback basis. Plans call for continued analysis in an attempt to identify a cost effective configuration with adequate fuel savings potential. Author

N85-13693# Aerospace Corp., Washington, D. C.
ELECTRIC VEHICLE MAINTENANCE
R. J. Kevala May 1984 91 p refs
(Contract DE-AC08-80CS-50101)
(PB84-233352; ATR-84(7066-04)-1) Avail: NTIS HC A05/MF A01 CSCL 13F

Reference material on trouble shooting maintenance, and repair of electric vehicles (EVs) for use by EV maintenance personnel is given. Basic principles of operation of the major EV components (batteries, motors, controllers) are included to help the user understand special installation, maintenance or repair needs. Causes of failure of batteries and motors are given. Battery selection, matching, installation and troubleshooting procedures are covered in detail. Different types of charges, motors and controllers used on present-day EVs in site operations are covered, as well as reported problems with passenger heaters, suspension systems and transmissions. GRA

88 SPACE SCIENCES (GENERAL)

N85-13694*# Lunar and Planetary Inst., Houston, Tex.
ACTIVITIES AT THE LUNAR AND PLANETARY INSTITUTE Semiannual Status Report, 1 Jan. - 30 Jun. 1984
30 Jun. 1984 87 p refs
(Contract NASw-3389)
(NASA-CR-174069; NAS 1.26:174069) Avail: NTIS HC A05/MF A01 CSCL 03B

Scientific and administrative activities are summarized. The status of the NASA-Ames vertical gun is reported. The organization and role of NASA's Research and Analysis Program in space and Earth sciences are described. For individual titles, see N85-13695 through N85-13697.

N85-13695*# Lunar and Planetary Inst., Houston, Tex.
ACTIVITIES AT THE LUNAR AND PLANETARY INSTITUTE, INTRODUCTION
In its Activities at the Lunar and Planetary Inst. 30 Jun. 1984 p 1-17 (For primary document see N85-13694 04-88)
Avail: NTIS HC A05/MF A01 CSCL 03B

Facilities and capabilities for disseminating imagery and other information are described as well as the computer center and production services offered. The scientific staff, visitor program, projects, conferences, publications, and communications are also discussed. Support for the Ames Vertical gun facility and the responsibilities of the Lunar and Planetary Science Council are summarized. A.R.H.

N85-13696*# Lunar and Planetary Inst., Houston, Tex.
NASA-AMES VERTICAL GUN Status Report **c14**
Peter H. Schultz *In its* Activities at the Lunary and Planetary Inst. 30 Jun. 1984 9 p (For primary document see N85-13694 04-88)
Avail: NTIS HC A05/MF A01 CSCL 14B

A national facility, the NASA-Ames vertical gun range (AVGR) has an excellent reputation for revealing fundamental aspects of impact cratering that provide important constraints for planetary processes. The current logistics in accessing the AVGR, some of the past and ongoing experimental programs and their relevance, and the future role of this facility in planetary studies are reviewed. Publications resulting from experiments with the gun (1979 to 1984) are listed as well as the researchers and subjects studied. A.R.H.

N85-13697*# Lunar and Planetary Inst., Houston, Tex.
NASA'S SESAC REPORT ON RESEARCH AND ANALYSIS IN SPACE AND EARTH SCIENCES
In its Activities at the Lunar and Planetary Inst. 30 Jun. 1984 18 p (For primary document see N85-13694 04-88)
Avail: NTIS HC A05/MF A01 CSCL 09B

The Research and Analysis Program is the core of the OSSA program in the space and Earth sciences because it provides the means of identifying the most appropriate missions and ensures that scientific results are fully realized. Consequently, this program must be given a priority in funding that is commensurate with that of flight programs. The goals of the R&A program and its role in meeting present day OSSA objectives; management of the R&A program by NASA Headquarters Discipline Chiefs and Programs Managers; and funding and distribution trends are assessed. Recommendations are advanced for halting the declining support of this program. A.R.H.

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N85-13698# Committee on Science and Technology (U. S. House).
SPACE TELESCOPE COST, SCHEDULE, AND PERFORMANCE REVIEW, 1984
Washington GPO Oct. 1984 50 p Rept. presented by the Subcomm. on Space Sci. and Appl. of the Comm. on Sci. and Technol., 98th Congr., 2nd Sess., Oct. 1984
(GPO-39-065) Avail: Subcommittee on Space Science and Applications

On May 22 and 24, 1984, the Subcommittee held oversight hearings to review the cost, schedule, and performance of the Space Telescope program. These hearings coincided with a particularly crucial time in the Space Telescope program. The manufacturing phase was drawing to a close and the assembly and integration phase was scheduled to begin in November 1984. Any problems found at this time could severely impact the remaining schedule and diminish the science return. It was also a crucial time because the true scope of the requirements for maintenance and refurbishment was just beginning to be considered. Finally, after two years of start-up operation, the role of the Space Telescope Science Institute was taking final form, and the Subcommittee wanted to compare its present status with that originally envisioned. Author

N85-13699*# Smithsonian Astrophysical Observatory, Cambridge, Mass.
A NORMAL INCIDENCE, HIGH RESOLUTION X-RAY TELESCOPE FOR SOLAR CORONAL OBSERVATIONS Semiannual Progress Report, 1 May - 31 Oct. 1984
Leon Golub Nov. 1984 101 p refs
(Grant NAGw-397)
(NASA-CR-174145; NAS 1.26:174145; SAPR-4) Avail: NTIS HC A06/MF A01 CSCL 03A

Efforts directed toward the completion of an X-ray telescope assembly design, the procurement of major components, and the coordination of optical fabrication and X-ray multilayer testing are reported. R.S.F.

N85-13700*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
DETECTION OF SUBMILLIMETER POLARIZATION IN THE ORION NEBULA
R. H. Hildebrand, M. Dragovan, and G. Novak (Chicago Univ., Ill.) Oct. 1984 20 p refs
(Grant NsG-2057)
(NASA-TM-86013; Rept-85008; NAS 1.15:86013) Avail: NTIS HC A02/MF A01 CSCL 03A

Linear polarization of the submillimeter (270 micron) continuum radiation from two regions of Orion was observed: one centered on the Kleinmann-Low Nebula and one centered on the 400 micron peak 1.5' south of the nebula. The polarizations measured for these regions are P = (1.7 +/-0.4)% at phi = 23 deg +/-7 deg and P=(1.7 +/- 0.5)% at phi = 27 deg +/- 7 deg respectively. A 2(sigma) upper limit, P < or = 1.6%, was found for the nebular W3(OH). The position angle at KL is orthogonal to that measured at 11 microns by Dyck and Beichman and at 11 and 20 microns by Knacke and Capps. The far-IR values for KL reported by Gull et. al. (approx < 2%) and by Cudlip et al. (1 to 2% level) are consistent with the submillimeter results. M.G.

N85-13701*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
FAR-INFRARED PHOTOMETRY OF COMPACT EXTRAGALACTIC SOURCES: OJ 187 AND BL LaC
Paul M. Harvey, Marshall Joy, Daniel F. Lester, and Bruce A. Wilking Oct. 1984 14 p refs
(Grant NAG2-67)
(NASA-TM-86022; Rept-85016; NAS 1.15:86022) Avail: NTIS HC A02/MF A01 CSCL 03A

The 50 and 100 micron emissions of OJ 287 were detected and upper limits for BL Lac were obtained. These first measurements of two BL Lac objects in the far-infrared show them to be similar to the few quasars previously observed in the far-infrared. In particular, there is no evidence for significant dust emission, and the lambda approximately 100 micron flux density fits on a smooth line joining the near-infrared and millimeter continuum fluxes. The implications of the results for models of the sources are discussed briefly. R.S.F.

N85-13702*# Cornell Univ., Ithaca, N.Y. Center for Radiophysics and Space Research.
FAR-INFRARED LINE EMISSION FROM THE GALAXY Ph.D. Thesis
Gordon John Stacey Jan. 1985 225 p refs
(Grant NsG-2347)
(NASA-CR-174166; NAS 1.26:174166; CRSR-823) Avail: NTIS HC A10/MF A01 CSCL 03A

The diffuse 157.74 micron (CII) emission from the Galaxy was sampled at several galactic longitudes near the galactic plane including complete scan across the plane at (II) = 2.16 deg and (II) = 7.28 deg. The observed (CII) emission profiles follow closely the nearby (12)CO (J=1to0) emission profiles. The (CII) emission probably arises in neutral photodissociation regions near the edges of giant molecular clouds (GMC's). These regions have densities of approximately 350 cm(-3) and temperatures of approximately 300 K, and amount to 4x10(8) solar mass of hydrogen in the inner Galaxy. The total 157.74 micron luminosity of the Galaxy is estimated to be 6x10(7) solar luminosity. Estimates were also made of the galactic emission in other far-infrared (FIR) cooling lines. The (CII) line was found to be the dominant FIR emission line from the galaxy and the primary coolant for the warm neutral gas near the galactic plane. Other cooling lines predicted to be prominent in the galactic spectrum are discussed. The 145.53 micron (OI) emission line from the Orion nebula was also measured. M.G.

N85-13703*# Joint Inst. for Lab. Astrophysics, Boulder, Colo.
OUTER ATMOSPHERES OF GIANT AND SUPERGIANT STARS
Alexander Brown [1984] 14 p refs
(Grant NAG5-82)
(NASA-CR-174165; NAS 1.26:174165) Avail: NTIS HC A02/MF A01 CSCL 03A

The properties of the chromospheres, transition regions and coronas of cool evolved stars are reviewed based primarily on recent ultraviolet and X-ray studies. Determinations of mass loss rates using new observational techniques in the ultraviolet and radio spectral regions are discussed and observations indicating general atmospheric motions are considered. The techniques available for the quantitative modeling of these atmospheres are outlined and recent results discussed. Finally, the current rudimentary understanding of the evolution of these outer atmospheres and its causes are considered. M.G.

N85-13704*# Joint Inst. for Lab. Astrophysics, Boulder, Colo.
RS CV SUB n BINARY SYSTEMS
Jeffrey L. Linsky [1984] 15 p refs
(Grants NAG5-82; NGL-06-003-057)
(NASA-CR-174164; NAS 1.26:174164) Avail: NTIS HC A02/MF A01 CSCL 03A

An attempt is made to place in context the vast amount of data obtained as a result of X-ray, ultraviolet, optical, and microwave observations of RS CVn and similar spectroscopic binary systems. Emphasis is on the RS CVn systems and their long period analogs. The following questions are considered: (1) are the original defining characteristics still valid and still adequate? (2) what is the evidence for discrete active regions? (3) have any meaningful physical properties for the atmospheres of RS CVn systems been derived? (4) what do the flare observations tell about magnetic fields in RS CVn systems? (5) is there evidence for systematic trends in RS CVn systems with spectral type? Author

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N85-13705*# Harvard Coll. Observatory, Cambridge, Mass.
ABSOLUTE TRANSITION PROBABILITIES OF LINES IN THE SPECTRA OF ASTROPHYSICAL ATOMS, MOLECULES, AND IONS Semiannual Status Report
W. H. Parkinson, Peter L. Smith, and K. Yoshino 10 Dec. 1984 18 p refs
(Grant NsG-7304)
(NASA-CR-174141; NAS 1.26:174141; SASR-15) Avail: NTIS HC A02/MF A01 CSCL 03B

Progress in the investigation of absolute transition probabilities (A-values or F values) for ultraviolet lines is reported. A radio frequency ion trap was used for measurement of transition probabilities for intersystem lines seen in astronomical spectra. The intersystem line at 2670 A in Al II, which is seen in pre-main sequence stars and symbiotic stars, was studied. R.S.F.

N85-13706# Stanford Linear Accelerator Center, Calif.
GALAXY AND CLUSTER FORMATION IN A UNIVERSE DOMINATED BY COLD DARK MATTER
Joel R. Primack Jul. 1984 8 p refs Presented at the 8th Johns Hopkins Workshop on Particles and Gravity, Baltimore, 20-22 Jun. 1984
(Contract DE-AC03-76SF-00515; Grant NSF PHY-81-15541)
(DE84-015879; SU-SLAC-PUB-3386; CONF-8406172-2) Avail: NTIS HC A02/MF A01

The dark matter (DM) that appears to be gravitationally dominant on all astronomical scales larger than the cores of galaxies can be classified, on the basis of its characteristic free-streaming damping mass as hot, warm, or cold. For the case of cold DM, the shape of the DM fluctuation spectrum is determined by the primordial spectrum (on scales larger than the horizon) and stagspansion, the stagnation of the growth of DM fluctuations that enter the horizon while the universe is still radiation-dominated. An attractive feature of the cold dark matter hypothesis is its considerable predictive power: the post-recombination fluctuation spectrum is calculable, and it in turn governs the formation of galaxies and clusters. Good agreement with the data is obtained for a Zeldovich spectrum of primordial fluctuations. DOE

N85-13707# Rome Univ. (Italy). Ist. di Fisica G. Marconi.
SEARCH FOR THE RADIATIVE DECAY OF A COSMIC RELIC PARTICLE WITH IUE
F. Bochicchio, G. Auriemma, A. Frenkel, and F. Massa 5 Jul. 1984 3 p refs Presented at 4th European IUE Conf. Submitted for publication
(Preprint-410) Avail: NTIS HC A02/MF A01

The UV background at the absolute value of > or = 45 deg was determined using low resolution large aperture IUE spectra. Apart from the identification of hot interstellar gas emission lines, a component of the continuum with a power law distribution was fitted to the spectrum, as expected from the decay of a primordial relic light particle. From this fit a candidate mass for the neutrino of 14.8 + or - 0.1 eV and a lifetime of 10 to the 16th power yr are obtained. The probability that statistical fluctuations could mimic this signal is estimated to be $< 2\%$. Implications of the results in terms of cosmology and particle physics are discussed.

Author (ESA)

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights. For spacecraft design see *18 Spacecraft Design Testing, and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

N85-13708*# California Inst. of Tech., Pasadena. Div. of Geological and Planetary Sciences.

MARS POLAR VOLATILES: TOPOGRAPHIC AND GEOLOGIC SETTING Status Report

Bruce Murray, Laurence Soderblom, and Kenneth Herkenhoff Oct. 1984 2 p

(Grant NAGw-549)

(NASA-CR-174089; NAS 1.26:174089) Avail: NTIS HC A02/MF A01 CSCL 03B

Progress on a project to elucidate the geological and topographic setting of the Martian polar volatiles is reported. The following accomplishments are enumerated: (1) all of the Mariner 9 imaging data sets available through JPL were acquired and copied; (2) Mariner 9 imagery was investigated in terms of the accuracy of the imaging footprints, dark current, and residual image; (3) the transfer functions of both vidicons were investigated; and (4) the magnitude of the atmospheric scattering was examined.

R.S.F.

N85-13709*# Lunar and Planetary Inst., Houston, Tex.

CONFERENCE ON THE ORIGIN OF THE MOON

1984 64 p refs Conf. held in Kona, Hawaii, 13-16 Oct. 1984; sponsored in cooperation with the American Astronomcal Society (Contract NASw-3389)

(NASA-CR-174068; NAS 1.26:174068; LPI-Contrib-540) Avail: NTIS HC A04/MF A01 CSCL 03B

Various topics relating to lunar evolution are discussed. The Moon's ancient orbital history, geophysical and geochemical constraints favoring the capture hypothesis, the site of the lunar core, chemical and petrological constraints, dynamical constraints, and mathematical models are among the topics discussed. For individual titles, see N85-13710 through N85-13757.

N85-13710*# Cornell Univ., Ithaca, N.Y. Dept. of Geological Sciences.

GEOPHYSICAL AND GEOCHEMICAL CONSTRAINTS FAVORING THE CAPTURE HYPOTHESIS Abstract Only

D. L. Turcotte *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 3 refs (For primary document see N85-13709 04-91)

Avail: NTIS HC A04/MF A01 CSCL 03B

The early fractionation of the Moon as a result of melting the outer layer of the Moon is discussed. This melting can be attributed to the accretional heating of the moon. Computations of the early thermal evolution of the Earth and Moon based on the assumption that these bodies accreted independently were carried out. The results are consistent with many observations. The concept of geochemical reservoirs was also applied to the Moon. R.J.F.

N85-13711*# Tokyo Univ. (Japan). Geophysical Inst.

LUNAR MAGMA OCEAN AND ITS IMPLICATION FOR ORIGIN OF THE MOON Abstract Only

Takafumi Matsui and Yutaka Abe *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 4 refs (For primary document see N85-13709 04-91)

Avail: NTIS HC A04/MF A01 CSCL 03B

A plausible accretional model of the Moon using as a constraint the formation of a magma ocean is discussed. Recently, it was shown that the surface of a planet growing by planetestimal impacts was heated over the melting temperature of surface materials due to the blanketing effect of an impact induced atmosphere. Using the same calculational scheme for the Earth, the early thermal history of the Moon growing by planetestimal impacts can be calculated for various accretional models. It is shown that a magma ocean covering the entire surface was formed in both models. Most important parameters related to surface temperature are safronov number and accretion time. Results show that a very small safronov number is needed for formation of the magma ocean. Safronov number is usually larger than 1 for accretion of planetestimals in heliocentric orbit. However, safronov number decreases when the Moon's growth is dominated by the proximity of the Earth. According to Harris, safronov number falls in the range of 0.02-0.1 for the binary accretion case. Therefore, it is suggested that the Moon was formed by accretion of planetestimals in geocentric orbits. R.J.F.

N85-13712*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

THE INITIAL THERMAL STATE OF THE MOON Abstract Only

A. B. Binder *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 5 (For primary document see N85-13709 04-91)

Avail: NTIS HC A04/MF A01 CSCL 03B

It is argued that the initial thermal state of the Moon was molten. The existence of young thrust fault scarps in the highlands and kbar stress drop, shallow moonquakes both suggest that the thermoelastic stresses in the outer crust are currently in the kbar range. This is expected if the Moon was initially molten, but not if the Moon had a magma ocean only a few hundred km deep. The thesis is also supported by reference to model studies of the concentrations of refractory incompatible elements. R.J.F.

N85-13713*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

THE SIZE OF THE LUNAR CORE Abstract Only

C. F. Yoder *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 6 (For primary document see N85-13709 04-91)

Avail: NTIS HC A04/MF A01 CSCL 03B

A 0.2 arc second phase shift in the 18.6 year forced precession of the lunar figure was inferred from analysis of lunar laser ranging data. The source of the phase shift is either viscous friction at a lunar core mantle boundary or solid friction caused by tidal flexing of the Moon by the Earth. Core mantle viscous coupling will explain the signature if the core radius R sub c approximately equals 330 km. On the other hand, solid friction can account for the signature only if the lunar solid friction 0 approximately equals 30 is abnormally small compared with that observed for, say, Mars (approximately equals 100 - 200). Although the inferred core radius is certainly within the limits imposed by the Apollo seismic experiment, it is significantly smaller than estimates of order 400-500 km from electromagnetic sounding. How accurate is the estimate of the R sub c derived from the phase shift? The effect of uncertainties in the frictional coupling mechanism, core density and ellipticity on the inferred core radius are discussed. The excitation of lunar free librations by core turbulence vis-a-vis other mechanisms (e.g., cometary or asteroidal impacts) and the influence of changes in lunar precession in the past on lunar dynamo generation are also examined. R.J.F.

N85-13714*# California Univ., Los Angeles. Dept. of Earth and Space Sciences.

ON THE APOLLO SUBSATELLITE EVIDENCE FOR A LUNAR CORE Abstract Only

C. T. Russell *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 7 (For primary document see N85-13709 04-91)

Avail: NTIS HC A04/MF A01 CSCL 03B

Two independent techniques used to infer the electrical conductivity of the interior of the Moon are discussed. The first is the measurement of an incident spectrum of electromagnetic waves in the solar wind near the Moon and the separate measurement of the incident plus reflected spectrum on the surface of the Moon. The second is the measurement of the distortion of the ambient magnetic field of the geomagnetic tail lobes by the conducting Moon. The size of the conducting region was found to be greater than 400 km in radius. R.J.F.

N85-13715*# California Univ., Santa Barbara. Dept. of Geological Sciences.
LUNAR MAGNETIC HISTORY Abstract Only
S. M. Cisowski and M. Fuller *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 8 ref (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

The origin of the lunar magnetic field remains a mystery. None of the various speculations are convincing. Suggestions of an early solar system field are not consistent with the low magnetization of the oldest samples. Models based upon a close approach of the Moon to the Earth have to account for the 300 M.Y. approach. Lunar dynamo models must explain why this dynamo which must operate in so small a core can operate so efficiently. It is concluded that it is now hard to escape from the idea that there was a relatively strong ancient lunar field between 3.9 and 3.6 B.Y. Moreover it is curious that the existence of this field coincided with the termination of the heavy bombardment of the Moon and mare basalt extrusion. R.J.F.

N85-13716*# Minnesota Univ., Minneapolis. Dept. of Geology and Geophysics.
MAGNETIC CONSTRAINTS ON EARLY LUNAR EVOLUTION REVISITED: LIMITS ON ACCURACY IMPOSED BY METHODS OF PALEOINTENSITY MEASUREMENTS Abstract Only
Subir K. Banerjee *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 9 refs (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

It is impossible to carry out conventional paleointensity experiments requiring repeated heating and cooling to 770 C without chemical, physical or microstructural changes on lunar samples. Non-thermal methods of paleointensity determination have been sought: the two anhysteretic remanent magnetization (ARM) methods, and the saturation isothermal remanent magnetization (IRMS) method. Experimental errors inherent in these alternative approaches have been investigated to estimate the accuracy limits on the calculated paleointensities. Results are indicated in this report. B.W.

N85-13717*# Newcastle-upon-Tyne Univ. (England). School of Physics.
IMPLICATIONS OF LUNAR PALAEOMAGNETISM FOR THE ORIGIN OF THE MOON Abstract Only
S. K. Runcorn *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 10 refs (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

Three issues relating to the origin of the Moon are investigated: the early formation of a fluid iron core, the nature of primeval heat sources in the Moon and the existence of a primeval satellite systems. The remanent magnetization of the Apollo samples was interpreted as evidence for an internally generated lunar magnetic field. The three independent methods of determining paleointensities (the Thellier, ARM (2) and IRM methods (3) are now in general agreement that the field was about 1 G 3.9 b yr ago declining exponentially to .02 G 3.2 b yr ago. Paleomagnetic directions of crustal strata have been determined from the Apollo 15 and 16 subsatellite magnetometer observations. The question whether these are randomly directed such as would be expected from local magnetization processes or are proof of the existence of an early core dynamo field is one of the key issues of lunar science. Although the presence of a lunar core was long ago suggested and there are now various different, although individually not conclusive arguments, the fit of the paleomagnetic data to the dipole hypothesis is strong evidence for the existence of a molten lunar iron core and implies a powerful heat source present in the earliest history of the Moon. B.W.

N85-13718*# Max-Planck-Inst. fuer Chemie, Mainz (West Germany).
CONSTRAINTS ON THE ORIGIN OF THE MOON FROM MOLYBDENUM AND OTHER SIDEROPHILE ELEMENTS Abstract Only
H. E. Newsom *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 13 refs (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

New data on the concentration of molybdenum in the mantle of the Earth and in lunar rocks confirm that most siderophile elements in lunar crustal rocks and lunar basalts derived from the interior have significantly lower concentrations than in the Earth's mantle and much lower concentrations compared to chrondritic meteorites. Different but correlated depletions of Co and P have been found in different lunar samples. The Mo data appear to be correlated with the P and Co depletions. The variations siderophile contents may be explained by small variations in the segregation of the siderophile element data which are consistent with theories for either a terrestrial gran independent origin for the Moon. It is suggested that the Moon formed from the Earth's mantle (depleted in siderophile elements) and segregation of metal within the Moon further lowered the concentrations compared to the Earth's mantle. The Mo data support evidence from other siderophile elements that the Moon almost certainly contains a metal core or pools of segregated metal. B.W.

N85-13719*# Australian National Univ., Canberra. Research School of Earth Sciences.
NICKEL-COBALT SYSTEMATICS AND THEIR BEARING ON LUNAR ORIGIN Abstract Only
A. E. Ringwood and S. Seifert *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 14 refs (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

The earliest metal phases to crystallize from the least-fabricated low Ti mare basalts contain about 30% Ni and 2 to 7% of Co. Experimental investigations of partitioning of Ni and Co between primitive lunar basaltic magmas and metal phases are currently in progress. Preliminary results show that the metal phase crystallizing near the liquidus of Green Glass (185 ppm Ni, 70 ppm Co) would contain about 40% Ni and 2.3% Co. It seems, therefore, that if a lunar core does exist, as suggested by the results of (2), it is relatively rich in Ni (30-40%) and Co (2-7%). This composition presents a remarkable contrast to that of the Earth's core which is estimated to contain about 6% Ni and 0.3% Co. Explanations for the differing densities of Earth and Moon are imvestigated. B.W.

N85-13720*# State Univ. of New York, Albany. Dept. of Geological Sciences.
ABUNDANCIES OF Ni, Cr, CO AND MAJOR ELEMENTS IN THE SILICATE PORTION OF THE MOON: CONSTRAINTS FROM PRIMARY LUNAR MAGMAS Abstract Only
J. W. Delano *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 15 refs (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

The lunar volcanic glasses are samples of primary magnas derived by partial melting of the Moon mantle. The twenty-seven varieties of glass define three linear arrays having nearly constant Mg/Si ratios. The low-Ti magmas in each array approach the chondritic Ti/Al ratio. In addition, the Ca/Al ration in these low-Ti magmas trends toward the chrondritid value as one proceeds from array 1 through array 3. Using the chemistries of these primary magmas, as well as the assumption that the Moon possesses chondritic Ca/Al/Ti/Mg ratios, the silicate composition of the Moon has been estimated. The implications of these results are discussed. B.W.

N85-13721*# New Mexico Univ., Albuquerque. Dept. of Geology.

Ge ABUNDANCES IN THE LUNAR MANTLE AND IMPLICATIONS FOR THE ORIGIN OF THE MOON Abstract Only

Tammy Dickinson and Horton Newsom *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 16 refs (For primary document see N85-13709 04-91)

Avail: NTIS HC A04/MF A01 CSCL 03B

Regardless of the origin of the Moon, metal segregation must have occurred within the moon in order to account for its low siderophile element abundances relative to the Earth or chondrites. Germanium is a strongly siderophile element whose bulk distribution coefficient indicates that it is not fractionated during igneous processes on the moon. The variability in absolute Ge abundances in mare basalts and pristine highland rocks, rather than elemental ratios, can be used to infer lunar mantle abundances and processes. Literature data have been compiled for Ge abundances in mare basalts and pristine highland rocks. For some landing sites, samples with $>$ 12 ppb Ge were considered to be extreme outliers and are not included. The Apollo 15 samples are enriched in Ge by a factor of 2.5 over the Apollo 12, 16 and 17 samples. Other siderophile element variations have been found in the Moon. Based on this data, best estimate of the average Ge abundance in the silicate portion of the Moon is 3.52 ppb. The Moon is depleted, relative to chondritic abundances, by a factor of 38,000 normalized to Si. Two possible explanations for the observed variations in Ge abundance in the Moon are: (1) more metal may have segregated from some regions of the Moon than from others; or Ge-bearing material may been been added later in the evolution of the Moon. B.W.

N85-13722*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

IS PHOSPHORUS PREDICTABLY INCOMPATIBLE IN IGNEOUS PROCESSES? Abstract Only

C. A. Goodrich (New Mexico Univ., Albuquerque) and S. Barnes *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 17 refs (For primary document see N85-13709 04-91)

Avail: NTIS HC A04/MF A01 CSCL 03B

Siderophile element abundances are central to recent models for core formation in the Earth and Moon and the origin of the Moon. It is important to identify siderophile elements whose behavior in igneous processes is predictable, so that primary mantle abundances can be deduced by subtracting out the effects of igneous processes. Newsom's model for core formation in the Moon requires subchondritic P, and suggests that P was depleted due to volatility. Experiments were conducted to determine P olivine/liquid distribution coefficients. Preliminary results indicate that P can be compatible with olivine during rapid cooling, but is not during isothermal crystallization with long growth times, and tends to be expelled during annealing. It is therefore not likely that P is compatible under any widespread igneous conditions, and the incompatible behavior of P in lunar crustal rocks can be safety assumed. In addition, low fO2 is insufficient to cause P compatibility, so it is unlikely that P-rich silicates formed during the early evolution of the Earth or Moon. These results indicate that P is depleted in the Moon. M.G.

N85-13723*# California Univ., Los Angeles. Inst. of Geophysics.

MEGAREGOLITH THICKNESS, HEAT FLOW, AND THE BULK COMPOSITION OF THE MOON Abstract Only

Paul H. Warren and Kaare L. Rasmussen (Copenhagen Univ.) *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 18 refs (For primary document see N85-13709 04-91)

Avail: NTIS HC A04/MF A01 CSCL 03B

Models developed to assess the effects of megaregolith on lunar thermal evolution are discussed. It is confirmed that the two sites where lunar heat flow was measured are probably unrepresentative, with heat flows about 25% higher than regional averages, due to focussing of heat flow towards regions with thin megaregolith. Numerous lines of evidence indicate that the megaregolith is generally 2 to 3 km thick under highlands (which cover about 83% of the total lunar surface), and $<$ 1 km thick under maria. In most models, megaregolith thickness is assumed to be roughly 6x greater over highlands than over maria. Based on sparse data for porosity among lunar rock types, and the correlation between thermal conductivity and porosity, it is assumed that megaregolith conductivity is roughly 20 kiloerg s(-1)cm(-1)K(-1), and bedrock conductivity is roughly 7x greater. It is also found that insulation by megaregolith exacerbates the problem of reconciling modest temperatures inferred for the (present) matle with a high rate of heat production; an upper limit of 30 ng/g for the bulk-Moon U content can be derived from this constraint alone. M.G.

N85-13724*# California Univ., Los Angeles. Inst. of Geophysics.

THE BULK-MOON MgO/FeO RATIO: A HIGHLANDS PERSPECTIVE Abstract Only

Paul H. Warren *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 19 (For primary document see N85-13709 04-91)

Avail: NTIS HC A04/MF A01 CSCL 03B

Compositional data for nonmare (highlands) samples suggest that the Moon's mg ratio (MgO/FeO) is higher than general estimates. Geochemically representative highlands soils have mg ratios of 0.66 (Apollo 16), 0.69 (Luna 20) and 0.73 (ALHA81005). These soils are mixtures of unrelated pristine nonmare rocks, of which there are at least three groups: Mg-rich rocks, ferroan anorthosites, and KREEP. Other than Mg-rich rocks, virtually all pristine rocks have mg 0.65. Thus, assuming the mixing process that sampled Mg-rich materials was random, the average mg of Mg-rich parent magmas was probably at least 0.70. More direct evidence can be derived from the Mg-rich rocks themselves. Nine of them have bulk-rock mg 0.87. Two (15445 A and 67435 PST) contain Fo(92) olivine. Production of melts that crystallized Fo(92) olivine implies that the mg ratios of source regions in lunar mantle were commensurably high. A quantification of this constraint is developed assuming that the parent melts formed by equilibrium (batch) partial melting. Implications of the model are discussed. M.G.

N85-13725*# Brown Univ., Providence, R. I. Dept. of Geological Sciences.

BULK COMPOSITION OF THE MOON IN THE CONTEXT OF MODELS FOR CONDENSATION IN THE SOLAR NEBULA Abstract Only

Kenneth A. Goettel *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 20 ref (For primary document see N85-13709 04-91)

Avail: NTIS HC A04/MF A01 CSCL 03B

The FeO content of the Moon is substantially higher than the present FeO content of the Earth's mantle. If the Moon formed by fission from the Earth's mantle, then the conclusion that the Earth's mantle must have been much richer in FeO at the time of fission appears firm. If the Moon formed independently in geocentric orbit, then the FeO contents of the two bodies should be similar, because both would be accreting from the same source of silicate material. Therefore, Earth's mantle at the time of lunar formation probably had an FeO content quite similar to the present FeO content of the Moon. This conclusion, if valid, has profound implications in two areas: (1) the differentiation history of the Earth's mantle and core; and (2) the processes responsible for governing the bulk compositions of the terrestrial planets. If Earth had more FeO than previously thought, then the composition differences between Earth and Mars are less than previously believed. This suggests that condensation temperature and heliocentric distance may have been less important in governing planetary compositions and other mechanisms, including iron/silicate fractionation may have been more important. The implication of this model for the compositions of the Moon and the other terrestrial planets are discussed. M.G.

N85-13726*# Tennessee Univ., Knoxville. Dept. of Geological Sciences.

PETROLOGIC CONSTRAINTS ON THE ORIGIN OF THE MOON:

EVIDENCE FROM APOLLO 14 Abstract Only
J. W. Shervais and L. A. Taylor *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 21 (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

The Fra Mauro breccias at Apollo 14 contain distinctive suites of mare basalts and highland crustal rocks that contrast significantly with equivalent rocks from other Apollo sites. These contrasts imply lateral heterogeneity of the lunar crust and mantle on a regional scale. This heterogeneity may date back to the earliest stages of lunar accretion and differentiation. Current theories requiring a Moon-wide crust of Ferroan Anorthosite are based largely on samples from Apollo 16, where all but a few samples represent the FAN suite. However, at the nearside sites, FAN is either scarce (A-15) or virtually absent (A-12, A-14, A-17). It is suggested that the compositional variations could be accounted for by the acceleration of a large mass of material (e.g., 0.1 to 0.2 moon masses) late in the crystallization history of the magma ocean. Besides adding fresh, primordial material, this would remelt a large pocket of crust and mantle, thereby allowing a second distillation to occur in the resulting magma sea. M.G.

N85-13727*# Arizona Univ., Tucson. Lunar and Planetary Lab.
ORIGIN OF THE MOON: CONSTRAINTS FROM VOLATILE ELEMENTS Abstract Only
Melanie E. Kreutzberger, Michael J. Drake, and John H. Jones *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 22 refs (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

Supporting arguments for the lunar fusion hypothesis include the low density of the Moon corresponding to the density of the Earth's mantle and the low volatile content of the lunar rocks vs. those of terrestrial origin. Vapor pressures of the alkali elements and their oxides increase in the following order: Na, K, Rb and Cs. The Moon should, therefore, be more depleted in Cs relative to Rb, Rb relative to K, and K relative to Na than the Earth if the fission model is correct. Analyses of lunar mare basalts and terrestrial mid-ocean ridge and other young basalts indicate that this behavior is not observed. It is possible that monovalent alkali elements might be lost from silicate materials in a different order than that inferred from elemental and oxide vapor pressures, as a result of differences in the way they are bound in silicate materials. To test this hypothesis a series of experiments was conducted to investigate alkali loss at high temperatures. Analyses indicate that the behavior of volatiles dissolved in a silicate melt is similar to that inferred from elemental and oxide vapor pressures. It is concluded that alkali element ratios in the Earth and Moon are not readily interpreted in terms of the fission hypothesis. M.G.

N85-13728*# Wien Univ. (Austria). Inst. for Analytical Chemistry.
VOLATILE ELEMENTS IN AND ON LUNAR VOLCANIC GLASSES: WHAT DO THEY TELL US ABOUT LUNAR GENESIS? Abstract Only
C. Koeberl *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 23 refs (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

There are good reasons to believe that lunar volcanic glasses originated from a deep interior source. The presence of a thin layer of surface correlated elements on these glasses may indicate that the Moon has some reservoirs that are enriched in volatiles. Since the glasses themselves do not show similar enrichment, the source should be of limited extent. Three scenarios are advanced for the origin of these elements. The mechanism for lunar volcanism differs from the mechanism for volcanism on Earth since the former produces bubbling and the latter explosive fountaining. From the condensation behavior of the volatile compounds, which leads to heterogeneous condensation, it is concluded that comparing element ratios of surface correlated elements gives little sense. It seems as if the volatile reservoirs are of rather limited extent and that they do not enlarge the volatile content of the bulk Moon significantly. A.R.H.

N85-13729*# Washington Univ., St. Louis, Mo. Center for Space Sciences.
THE I-Pu-Xe AGE OF THE MOON Abstract Only
T. D. Swindle, M. W. Caffee, and C. M. Hohenberg *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 24 refs (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

The Rb-Sr analyses of some lunar samples which indicate that the Moon is close to the age of primitive meteorites are only reliable to within about 100 m.y. A potentially more precise chronometer is the I-Pu-Xe system. I129 has a 17 m.y. halflife and decays to Xe129; Pu244, with an 82 m.y. halflife, produces Xe131 to Xe136 in fission. The I129/Pu244 ratio has a halflife of 21 m.y. Xenon retention for the Earth could have begun as late as the event that gave birth to the Moon. For the Moon, it is hard to imagine that xenon retention could have begun before re-accretion of the fissioned (and initially dispersed?) material, particularly if that material got hot enough to account for the depletion of the volatile elements. Thus, if fission model are correct, xenon retention in the Earth certainly began no later than in the Moon, and possibly began earlier. Therefore, the I-Pu-Xe system is only marginally consistent with a fission origin. If further study confirms that the I/U ratio of the Moon is .01 or less, or if gas-rich lunar highland breccias with higher ratios of I129 to Pu244 are found, it would be difficult to explain the results in an earth-fission model of lunar origin. A.R.H.

N85-13730*# Australian National Univ., Canberra.
TESTS OF THE LUNAR HYPOTHESIS Abstract Only
S. R. Taylor *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 25 refs (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

The concept that the Moon was fissioned from the Earth after core separation is the most readily testable hypothesis of lunar origin, since direct comparisons of lunar and terrestrial compositions can be made. Differences found in such comparisons introduce so many ad hoc adjustments to the fission hypothesis that it becomes untestable. Further constraints may be obtained from attempting to date the volatile-refractory element fractionation. The combination of chemical and isotopic problems suggests that the fission hypothesis is no longer viable, and separate terrestrial and lunar accretion from a population of fractionated precursor planetesimals provides a more reasonable explanation. A.R.H.

N85-13731*# California Univ., Santa Barbara. Dept. of Mechanical and Environmental Engineering.
CONSTRAINTS ON LUNAR ORIGIN: EVIDENCE PRESERVED IN PRECAMBRIAN STROMATOLITES Abstract Only
J. P. Vanyo *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 29 ref (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

The existence of subaqueous unicellular algae and bacteria from the Precambrian period is evidenced by strongly abundant fossilized structures consisting of many layers of usually darker algae-bacterial growth alternating with layers of usually lighter sediment-precipitate. The earliest of these are dated to 3.5 billion years ago. A form of these stromatolites, Anabaria juvensis was analyzed and a sinusoidal columnar growth pattern was interpreted to be a response of stromatolite forming microbes to the changing inclination of the Sun over the seasons, with microbe growth rate positively related to solar intensity. Additional specimens are being used to develop a systematic methodology for extracting data evidencing Earth-Moon-Sun dynamics at the time of stromatolite formation. In particular, stromatolites span the time from 1 to 2 billion years ago, critical for several theories of lunar formation and/or Earth/Moon near encounter. Such cataclysmic events would influence stromatolite formation. A.R.H.

N85-13732*# Houston Univ., Tex. Dept. of Mechanical Engineering.
CONSTRAINTS ON THE ORIGIN OF VISCOELASTIC BODIES

Abstract Only
W. E. VanArsdale *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 30 refs (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

While the oceans undoubtly contribute to energy dissipation, it seems implausible that such a small amount (0.02%) of the Earth's mass could play such a dominant role in lunar orbital evolution. An alternate hypothesis assumes that most of the dissipation is associated with solid-body tides. This mechanism is also capable of varying significantly over time for viscoelastic bodies. In such an analysis of orbital evolution, the bodies are modeled as incompressible, Kelvin-Voight solids. While this material is simplistic, it does provide an analytical characterization of solid-body dissipation and the resulting tidal moment. The orbital history of a two body system is traced back in time to develop constraints on the satellite's origin. These constraints suggest the Moon appeared in a significantly inclined orbit at a distance greater than ten Earth radii. This distance is outside of the Roche limit and would appear to alleviate some difficulties associated with capture hypotheses. Small eccentricity at close approach suggests an origin by accretion. A.R.H.

N85-13733*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
TIDAL DISSIPATION IN THE EARTH AND MOON FROM LUNAR LASER RANGING Abstract Only
C. F. Yoder, J. G. Williams, J. O. Dickey, and X. X. Newhall *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 31 (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

The evolution of the Moon's orbit which is governed by tidal dissipation in the Earth while the evolution of its spin is controlled by its own internal dissipation is discussed. Lunar laser ranging data from August 1969 through May 1982 yields the values of both of these parameters. It is suggested that if the Moon was orbited the Earth since its formation, this must be an anomalously high value presumably due to changes in dissipation in the oceans due to continental drift. The explanation that the dissipation occurs at the interface between the mantle and a liquid core of shell is preferred. E.A.K.

N85-13734*# Solar System Associates, Great Falls, Va.
TWO LUNAR GLOBAL ASYMMETRIES Abstract Only
J. B. Hartung *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 32 refs (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

The Moon's center of mass is displaced from its center of figure about 2 km in a roughly earthward direction. Most maria are on the side of the Moon which faces the Earth. It is assumed that the Moon was initially spherically symmetric. The emplacement of mare basalts transfers mass which produces most of the observed center of mass displacement toward the Earth. The cause of the asymmetric distribution of lunar maria was examined. The Moon is in a spin orbit coupled relationship with the Earth and the effect of the Earth's gravity on the Moon is asymmetric. The earth-facing side of the Moon is a gravitational favored location for the extrusion of mare basalt magma in the same way that the topographically lower floor of a large impact basin is a gravitationally favored location. This asymmetric effect increases inversely with the fourth power of the Earth Moon distance. The history of the Earth-Moon system includes: formation of the Moon by accretion processes in a heliocentric orbit ner that of the Earth; a gravitational encounter with the Earth about 4 billion years ago resulting in capture of the Moon into a geocentric orbit and heating of the Moon through dissipation of energy related to tides raised during close approaches to the Earth(5) to produce mare basalt magma; and evolution of the Moon's orbit to its present position, slowly at first to accommodate more than 500 million years during which magmas were extruded. E.A.K.

N85-13735*# Illinois Univ., Urbana. Dept. of Aeronautical and Astronautical Engineering.
THE MOON'S ORBIT HISTORY AND INFERENCES ON ITS ORIGIN Abstract Only
B. A. Conway *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 33 refs (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

A frequency dependent model of tidal friction was used to determine the evolution of the Earth-Moon system. The analysis considers the lunar orbit eccentricity and inclination, the solar tide on the Earth, Earth oblateness, and higher order terms in the tidal potential. A solution of the equations governing the precession of the Earth's rotational angular momentum and the lunar ascending node is found. The history is consistent with a capture origin for the Moon. It rules out the origin of the Moon by fission. Results are shown for a range of assumed values for the lunar tidal dissipation. Tidal dissipation within the Moon, during what would be the immediate postcapture period, is shown to be capable of significantly heating the Moon. The immediate postcapture orbit has a periapsis within the Earth's Roche limit. Capture into resonance with the Earth's gravitational field as this orbit tidally evolves is suggested to be a mechanism to prevent so close, an approach. It is shown that the probability of such capture is negligibly small and alternative hypotheses for the survival of the Roche limit passage is offered. E.A.K.

N85-13736*# Washington Univ., St. Louis, Mo. Dept. of Earth and Planetary Sciences.
A REAPPRAISAL OF DARWIN'S FISSION HYPOTHESIS AND A POSSIBLE LIMIT TO THE PRIMORDIAL ANGULAR MOMENTUM OF THE EARTH Abstract Only
William B. McKinnon and S. W. Mueller *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 34 refs (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

G. H. Darwin proposed that the primordial Earth may have rotated fast enough that the solar tidal period was nearly resonant with the fundamental free oscillation period of a fluid Earth and that a large and unstable tidal oscillation split off to become the moon. Jeffreys argumented that dissipation during resonance would be sufficient to prevent such an unstable oscillation greater than the tidal frequency (period - 2.68 hr). It is considered that solar tides have extracted angular momentum from the Earth-Moon system over 4.5 b.y. The correspondence of the primordial tidal and resonant frequencies is nearly exact. (The effect of central condensation of the proto earth is to increase both frequencies by a similar amount, though the resonance is not precisely known. This result, was unknown to Darwin or Jeffreys. The effects of resonance were evaluated. The resonance is likely to be too damped for fission. This argument is more general than Jeffreys', who considered friction between the oscillating mantle and a rigid core. It is argued that the fact that Q must be so great for fission that equilibrium can not be maintained; the fluid proto Earth passes so quickly through resonance that maximum amplitude is not reached. It is suggested that solar resonant tides acted as a brake on the spin of the primordial partially molten Earth. Certain proposed origins for the Moon do not necessarily involve addition of substantial amounts of angular momentum to the Earth-Moon system. The primordial Earth-Moon system may have had nearly the same angular momentum as it has today. E.A.K.

N85-13737*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
NUMERICAL SIMULATIONS OF FISSION Abstract Only
R. H. Durisen, R. A. Gingold, and E. H. Scott *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 35 refs Prepared in cooperation with Indiana Univ., Bloomington (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

Hydrodynamic simulation techniques to the fission problem of the lunar origin were applied. It is indicated that, for fluids with the compressibility of stars, dynamic fission instabilities lead to spiral arm ejection of mass and angular momentum in the form of a ring or disk of debris, not as a single body. Some quantitative aspects of these results seem favorable to lunar origin by fission. Fission instabilities in fluid objects with a smaller degree of compressibility, more closely approximating terrestrial material are considered. Although the qualitative features are similar, there are significant quantitative differences for the stiffer equation of state. The implications of the results for the fission hypothesis of lunar origin are discussed. Evolutions illustrating possible approaches to instability are presented. E.A.K.

N85-13738*# Carnegie Institution of Washington, D. C.
THE DYNAMIC FISSION INSTABILITY AND THE ORIGIN OF THE MOON Abstract Only
Alan Paul Boss and Hiroshi Mizuno *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 36 refs (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

A theory for the formation of the Moon which involves the dynamic fission of a rapidly rotating protoplanet, which might then result in the formation of the Earth and the Moon is discussed. The fission hypothesis was originally based on analytic, linearized models of the growth of asymmetry in homogenous bodies. The fully nonlinear evolution of the dynamic instability in inviscid, compressible bodies was calculated by numerical techniques. It was found that the dynamic instability degenerates into the ejection of a ring of matter with a substantial fraction of the mass, leaving behind a central body with most of the mass. The linearized analytical approach and the numerical approach were used to show that dynamic fission probably does not occur in rocky protoplanets. The numerical calculations are performed with a fully three dimensional hydrodynamical code, which allows the nonlinear, time evolution of the instability to be followed. Sequences of uniformly rotating equilibria were constructed and are used as the initial models for the fission calculations. An initially imposed asymmetry consisting of a 10% binary perturbation in the density was found to disappear on the rotational period time scale. No dynamic instability occurred. This result are verified by including the velocity dissipation terms in the linearized analysis of the stability of a Maclaurin spheroid: the dynamic instability disappears when the simulated viscous dissipation terms are included. It is concluded that any rocky body, even with considerable partial melt or a molten core, should be stable to dynamic fission; any rotational instability that occurs can only result in equatorial mass loss. E.A.K.

N85-13739*# Carnegie Institution of Washington, D. C.
TIDAL DISRUPTION AND THE ORIGIN OF THE MOON Abstract Only
Hiroshi Mizuno and Alan Paul Boss *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 37 (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

The dynamic problem of the tidal disruption of a rocky planetesimal was solved by a direct integration of the fully three-dimensional, nonlinear equations of motion. The hypothesis that any object that passes within the Roche limit is disrupted was disproven. A time dependent solution was performed numerically, treating the planetismal as a fluid with a Murnaghan equation of state in the solid regions and zero pressure otherwise. Calculations show that a rocky body which passes by the Earth on a parabolic orbit with a perigee within the Roche limit is not tidally disrupted. Objects on hyperbolic orbits would experience even less tidal disruption. The results herein do not apply to bodies with very low viscosity. It is shown, however, that tidal disruption can be ruled out as a mechanism for reducing planetismal masses. Mechanisms for forming the Moon which rely upon tidal disruption are unlikely to be correct. R.S.F.

N85-13740*# Lewis (John S.) Associates, Inc., Tucson, Ariz.
A NUMERICAL INVESTIGATION OF PLANETESIMAL COLLISION TRAJECTORIES WITH A MOON ACCUMULATING IN EARTH ORBIT Abstract Only
L. P. Cox *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 38 refs (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

In the scenario of lunar origin in which the Moon is assumed to have accreted most of its mass while in orbit about the Earth, ismals on the accrea knowledge of the relative impact rates of heliocentric planetting Earth and Moon is essential for any attempt to establish dynamical constraints on lunar origin. Numerical integrations of the regularized equations of motion for four bodies (Sun, Earth, Moon, planetismal) were done. A planetismal impact trajectory was calculated by assuming that the planetismal has hit the surface of the Moon at an assumed location, traveling in an assumed direction, and with an assumed impact speed. Next, the equations of motion were numerically integrated backward in time in order to determine from where the planetismal has come. In this way those volumes in heliocentric orbital element space which contribute trajectories that directly impact the Moon. R.S.F.

N85-13741*# Planetary Science Inst., Tucson, Ariz.
STOCHASTIC DOES NOT EQUAL AD HOC Abstract Only
William K. Hartmann *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 39 refs (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

Some classes of influential events in solar system history are class-predictable but not event-predictable. Theories of lunar origin should not ignore class-predictable stochastic events. Impacts and close encounters with large objects during planet formation are class-predictable. These stochastic events, such as large impacts that triggered ejection of Earth-mantle material into a circum-Earth cloud, should not be rejected as ad hoc. A way to deal with such events scientifically is to investigate their consequences; if it can be shown that they might produce the Moon, they become viable concepts in theories of lunar origin. R.S.F.

N85-13742*# Denison Univ., Granville, Ohio. Dept. of Geology.
A TESTABLE GRAVITATIONAL CAPTURE MODEL FOR THE ORIGIN OF THE EARTH'S MOON Abstract Only
Robert J. Malcuit, Ronald R. Winters, and Michael E. Mickelson *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 43 (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

A gravitational capture model is proposed to explain lunar evolution. The model is divided into five orbital eras. In the first era, it is postulated that the pre-capture Moon formed as a small planetary unit on the inner edge of the Asteroid Zone. Orbital era 2 commenced when the Moon's orbit became Earth-crossing. As the Moon underwent periodic gravitational encounters with Earth in a near Earth orbit (orbital era 3), the lunar body because warmer and thus more easily capture. Era 4 saw the Moon inserted into a geocentric orbit that gradually became more circular. Following orbital circulation, the lunar orbit gradually expanded to its present dimensions (era 5). R.S.F.

N85-13743*# Denison Univ., Granville, Ohio. Dept. of Geology.
DIRECTIONAL PROPERTIES OF CIRCULAR MARIA: INTERPRETATION IN THE CONTEXT OF A TESTABLE GRAVITATIONAL CAPTURE MODEL FOR LUNAR ORIGIN Abstract Only
Robert J. Malcuit, Ronald R. Winters, and Michael E. Mickelson *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 44 refs (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

Photogeologic study of circular lunar maria and mare-filled craters reveals that several of these features are either elliptical and/or asymmetrical. The ellipticity/asymmetry is interpreted as a directional property which may have genetic significance. Most maria indicate movement in easterly directions. The directional properties of these features are consistent with at least three models of mare basin formation: (1) mare basins were excavated by a swarm of fragments from a tidally disrupted planetary body impacting from a westerly direction; (2) mare basins were excavated by lunar satellites whose orbits decayed sufficiently to cause the satellites to impact onto the lunar surface from a westerly direction; and (3) basins were formed by the impact of large spheroids of lunar basalt onto the lunar surface from a westerly direction. R.S.F.

N85-13744*# Pittsburgh Univ., Pa. Dept. of Geology and Planetary Science.

THE PROBLEM OF IRON PARTITION BETWEEN EARTH AND MOON DURING SIMULTANEOUS FORMATION AS A DOUBLE PLANET SYSTEM Abstract Only

W. A. Cassidy *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 45 refs (For primary document see N85-13709 04-91)

Avail: NTIS HC A04/MF A01 CSCL 03B

A planetary model is described which requires fractional vapor/liquid condensation, planet accumulation during condensation, a late start for accumulation of the Moon, and volatile accretion to the surfaces of each planet only near the end of the accumulation process. In the model, initial accumulation of small objects is helped if the agglomerating particles are somewhat sticky. Assuming that growth proceeds through this range, agglomeration continues. If the reservoir of vapor is being preferentially depleted in iron by fractional condensation, an iron-rich planetary core forms. As the temperature decreases, condensing material becomes progressively richer in silicates and poorer in iron, forming the silicate-rich mantle of an already differentiated Earth. A second center of agglomeration successfully forms near the growing Earth after most of the iron in the reservoir has been used up. The bulk composition of the Moon then is similar to the outer mantle of the accumulating Earth. R.S.F.

N85-13745*# Australian National Univ., Canberra. Research School of Earth Sciences.

ORIGIN OF THE MOON Abstract Only

A. E. Ringwood *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 46 refs (For primary document see N85-13709 04-91)

Avail: NTIS HC A04/MF A01 CSCL 03B

The similarities in siderophile abundances strongly suggest that the Moon was derived from the Earth's mantle after the Earth's core had formed. The energy required to remove material from the Earth's mantle and place it into geocentric orbit can be supplied most readily by impact processes during accretion of the Earth. Impacts of late-accreting, high-velocity planetismals would evaporate many times their masses of mantle material. These gases would be accompanied by a massive spray of shock-melted silicate droplets. It is suggested that the gases produced from such near-equatorial impacts were rapidly spun out into equatorial geocentric orbit. The evaporated material was selectively recondensed, and, accompanied by the shock melted, devolatilized silicate droplets, accreted to form a sediment ring of Earth-orbiting planetismals. This sediment ring also captured a significant proportion of Earth-bound planetismals. The Moon was formed by accretion from planetismals comprising the sediment ring. R.S.F.

N85-13746*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

ON THE ORIGIN OF THE MOON BY ROTATIONAL FISSION Abstract Only

A. B. Binder *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 47 refs (For primary document see N85-13709 04-91)

Avail: NTIS HC A04/MF A01 CSCL 03B

Consistent with the current understanding of the Moon's bulk composition, internal structure, seismic and tectonic characteristics, evidence is discussed which suggests that the Moon originated by fission. The concepts discussed are: (1) all stars are members of close or contact binary systems; (2) advances in dynamical studies of the fission hypothesis show that stellar bodies also undergo fission; (3) the newly formed proto moon would have lost a large fraction of its original mass via mass transfer; and (4) due to the foregoing concepts the result would be a moon of terrestrial mantle material which was depleted in both metallic iron and volatiles. E.R.

N85-13747*# Max-Planck-Inst. fuer Chemie, Mainz (West Germany).

GEOCHEMICAL EVIDENCE FOR THE FORMATION OF THE MOON BY IMPACT INDUCED FISSION OF THE PROTO-EARTH Abstract Only

H. Waenke and G. Dreibus *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 48 refs (For primary document see N85-13709 04-91)

Avail: NTIS HC A04/MF A01 CSCL 03B

Geochemical evidence is discussed which advocates the theory that the Moon was formed by impact induced fission of the Earth. The Earth's mantle exhibits a number of geochemical peculiarities which make our planet a unique object in the solar system. Terrestrial basalts are compared with those from the Eucrite parent body and the Shergotty parent body. Also the Moon's composition is very close to the Earth's in all details except the lower FeO content which is explained. Evidence is discussed for the plausible physical process of formation of the Moon by impact induced fission. Also the theory that impact induced fission occurred at the moment at which accretion of the Earth was not totally complete is briefly discussed. E.R.

N85-13748*# Planetary Science Inst., Tucson, Ariz.

AN INTEGRATED DYNAMICAL AND GEOCHEMICAL APPROACH TO LUNAR ORIGIN MODELLING Abstract Only

R. Greenberg, C. R. Chapman, D. R. Davis, M. J. Drake, W. K. Hartmann, f. L. Herbert, J. Jones, and S. J. Weidenschilling *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 51 refs Prepared in cooperation with Arizona Univ., Tucson (For primary document see N85-13709 04-91)

Avail: NTIS HC A04/MF A01 CSCL 03B

The three major categories of models of lunar origin which explain the Moon's properties are complete and a more general scenario is presented. The model presented is as the Earth grew by planetesimal bombardment, a circumterrestrial cloud of particles was created from a combination of impact ejected mantle material and planetismals captured directly into orbit around the Earth. The compositional properties are explained two ways: (1) a few big late planetismals of diverse composition are captured in orbit and/or hit the Earth; and (2) the circumterrestrial swarm acts as a filter, preferentially capturing small weak silicate bodies, while passing large iron planetismals. E.R.

N85-13749*# Planetary Science Inst., Tucson, Ariz.

LUNAR ORIGIN: ROLE OF GIANT IMPACTS Abstract Only

William K. Hartmann *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 52 refs Prepared in cooperation with Arizona Univ., Tucson (For primary document see N85-13709 04-91)

Avail: NTIS HC A04/MF A01 CSCL 03B

The explanation that lunar origin involved giant impacts remains attractive. Large planetesimals are consistent with current accretion models, and may have been widely scattered in the early solar system; their existence is a reasonable, assumption in Moon origin models. Isotopic data require the Moon's formation primarily from local material resembling Earth's upper mantle, not material from elsewhere in the solar system. Giant impacts are stochastic, class predictable events that would provide the required type of ejected Earth mantle material without requiring large moons to form near other planets (a problem with less stochastic processes). Such material may have mixed with incoming meteorites during lunar formation, affecting lunar chemistry. Author

N85-13750*# Arizona Univ., Tucson. Lunar and Planetary Lab.

MODELS OF ANGULAR MOMENTUM INPUT TO A CIRCUMTERRESTRIAL SWARM FROM ENCOUNTERS WITH HELIOCENTRIC PLANETESIMALS Abstract Only

Floyd Herbert and Donald R. Davis *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 53 refs Prepared in cooperation with Planetary Science Inst., Tucson, Ariz. (For primary document

see N85-13709 04-91)
(Contract NASw-3516)
Avail: NTIS HC A04/MF A01 CSCL 03B

Preliminary experiments show that heliocentric planetesimals passing through the Earth environment possess significant angular momentum. However it also appears that these same planetesimals impacting a circularized circumterrestrial planetesimal swarm would likely remove angular momentum (though possibly increasing mean kinetic energy), presumably promoting both swarm infall upon the Earth and escape to heliocentric space. Only a distribution of highly eccentric satellite orbits with mean tangential velocities of a few tens of percent of local circular velocity would be immune against angular momentum loss to passing heliocentric planetesimals. Author

N85-13751*# Planetary Science Inst., Tucson, Ariz.
CAPTURE OF PLANETESIMALS INTO A CIRCUMTERRESTRIAL SWARM Abstract Only
Stuart J. Weidenschilling *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 54 refs Prepared in cooperation with Arizona Univ., Tucson (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

The lunar origin model considered involves processing of protolunar material through a circumterrestrial swarm of particles. Once such a swarm has formed, it can gain mass by capturing infalling planetesimals and ejecta from giant impacts on the Earth, although the angular momentum supply from these sources remains a problem. Examined is the first stage of formation of a geocentric swarm by capture of planetesimals from initialy heliocentric orbits. The only plausible capture mechanism that is not dependent on very low approach velocities is the mutual collision of planetesimals passing within Earth's sphere of influence. This capture scenario was tested directly by many body numerical integration of planetesimal orbits in near Earth space. Results agree that the systematic contribution of angular momentum is insufficient to maintain an orbiting swarm under heavy bombardment. Thus, a circumterrestrial swarm can be formed rather easily, but is hard to sustain because the mean net angular momentum of a many body swarm is small. Author

N85-13752*# Planetary Science Inst., Tucson, Ariz.
THE LUNAR ANGULAR MOMENTUM PROBLEM Abstract Only
Stuart J. Weidenschilling *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 55 refs Prepared in cooperation with Arizona Univ., Tucson (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

Formation of the Moon by classical Darwin-type fission of a rapidly spinning proto-Earth is discussed. The relationship of angular momentum to accretion disks is examined. The co-accretion scenario and Darwin-type fission are compared and evaluated. B.G.

N85-13753*# Planetary Science Inst., Tucson, Ariz.
A CIRCUMTERRESTRIAL COMPOSITIONAL FILTER Abstract Only
Clark R. Chapman and Richard Greenberg *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 56 refs Prepared in cooperation with Arizona Univ., Tucson (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

A major question about the Moon is its under abundance of iron. The proposal of whether a metal-silicate fractionation of heliocentric bodies could be achieved through collisional interactions with a circumterrestrial swarm is examined. The whole scenario works only if there is a way to maintain the hypothesized circumterrestrial swarm, which otherwise would collisionally diffuse on a time scale of 100 yr (much of it collapsing on the Earth); the source of angular momentum to maintain the swarm remains a mystery. B.G.

N85-13754*# California Univ., Los Angeles. Inst. of Geophysics and Planetary Physics.
THE ORIGIN OF THE MOON Abstract Only
John T. Wasson and Paul H. Warren *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 57 refs (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

Bulk density alone shows that the Moon is depleted in metallic FeNi relative to the Earth or to chondritic meteorites. This depletion implies that the Moon formed not from chondrites but from differentiated material. Origin of the Moon by fission from the Earth offers a simple explanation for its depletion in FeNi, but this mechanism seems unlikely because of associated dynamical difficulties. Lunar volatile element depletions were invoked in support of fission, but volatile contents of eucritic meteorites are similarly low and the eucrites did not form by Earth fission. A more plausible origin of the Moon is accretion from the circumterrestrial swarm. The low FeNi content of the Moon is understood if the mean size of interplanetary silicate particles was much smaller than that for metal particles, since this would have led to preferential capture of silicates into Earth orbit, but the question arises whether the mean particle size of the metallic particles was great enough to prevent their capture into the swarm. B.G.

N85-13755*# Harvard-Smithsonian Center for Astrophysics, Cambridge, Mass.
FORMATION OF THE PRELUNAR ACCRETION DISK Abstract Only
A. G. W. Cameron *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 58 refs (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

The collisional origin of the Moon is considered. The angular momentum of the Earth-Moon system is less than sufficient to spin the Earth to rotational instability; nevertheless the mass of the body striking a tangential blow to the protoearth, imparting the angular momentum of the Earth-Moon system to the protoearth is examined. B.G.

N85-13756*# California Univ., Los Angeles. Dept. of Earth and Space Sciences.
MECHANICAL MODELS OF CLOSE APPROACHES AND COLLISIONS OF LARGE PROTOPLANETS Abstract Only
W. M. Kaula and A. E. Beachey *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 59 refs (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

In models of lunar origin by great impact, attention is usually paid to the hydrodynamic expansion resulting from the great amount of thermal energy. However, the source of this disruption is inevitably significant in a close approach between large bodies, it is to be expected that significant departures from simple hyperbolic orbits would occur even before impact. These departures could arise from mechanical effects, and hence purely mechanical models are worth pursuing. The most interesting results obtained for approach offsets are small multiples of the planet radius and approach velocities of a few kilometers/second. In an interaction between Mars and Earth sized protoplanets, most of the material ends in collision, but a few percent end in elliptic orbits and a few percent escape. Another model considered is an offset collision, arising from a wide range of approach velocities and offsets. B.G.

N85-13757*# California Inst. of Tech., Pasadena. Div. of Geological and Planetary Sciences.
LUNAR ORIGIN FROM IMPACT ON THE EARTH Abstract Only
David J. Stevenson *In* Lunar Planetary Inst. Conf. on the Origin of the Moon 1984 p 60 refs (For primary document see N85-13709 04-91)
Avail: NTIS HC A04/MF A01 CSCL 03B

All theories of lunar origin involve events or processes which seemingly have low efficiencies or low probabilities or both. An impact-triggered fission lunar origin is presented. If the impact ejecta (a mixture of target and projectile) leave the impact site ballistically and are subsequently acted upon only by the gravity field of a spherical Earth, then the ejecta either reimpacts the Earth or escapes on a hyperbolic trajectory. Hence the need for a second burn. Three possible resolutions are considered: pressure gradient acceleration, non-central gravity, and viscous spreading. B.G.

N85-13758*# Rice Univ., Houston, Tex.
LABORATORY STUDIES OF ATOMIC COLLISION PROCESSES OF IMPORTANCE IN PLANETARY ATMOSPHERES Semiannual Status Report
R. F. Stebbings and Ken Smith 31 Aug. 1984 27 p
(Grant NsG-7386)
(NASA-CR-174142; NAS 1.26:174142) Avail: NTIS HC A03/MF A01 CSCL 03B

Progress in the following research supported under NSG 7386 is reported: (1) measurement of differential cross sections for atomic and molecular collisions relevant to analysis and modeling of data from Pioneer 11, Pioneer 12, Voyager 1, and Voyager 2; (2) analysis of measured differential cross section results to provide scattering data in forms that are easy to apply to atmospheric modeling work; (3) analysis of the data to give basic information on the molecular potentials involved in the scattering process; and (4) development and initial use of apparatus to study dissociative processes in neutral molecules. R.S.F.

N85-13759*# Atmospheric and Environmental Research, Inc., Cambridge, Mass.
OUTER SATELLITE ATMOSPHERES: THEIR NATURE AND PLANETARY INTERACTIONS Annual Report, 1 Jun. 1983 - 31 Jul. 1984
William H. Smyth and Michael R. Combi Nov. 1984 56 p refs
(Contract NASw-3387)
(NASA-CR-174146; NAS 1.26:174146) Avail: NTIS HC A04/MF A01 CSCL 03B

Significant insights regarding the nature and interactions of Io and the planetary magnetosphere were gained through modeling studies of the spatial morphology and brightness of the Io sodium cloud. East-west intensity asymmetries in Region A are consistent with an east-west electric field and the offset of the magnetic and planetary-spin axes. East-west orbital asymmetries and the absolute brightness of Region B suggest a low-velocity (3 km/sec) satellite source of 1 to 2 x 10(26) sodium atoms/sec. The time-varying spatial structure of the sodium directional features in near Region C provides direct evidence for a magnetospheric-wind-driven escape mechanism with a high-velocity (20 km/sec) source of 1 x 10(26) atoms/sec and a flux distribution enhanced at the equator relative to the poles. A model for the Io potassium cloud is presented and analysis of data suggests a low velocity source rate of 5 x 10(24) atoms/sec. To understand the role of Titan and non-Titan sources for H atoms in the Saturn system, the lifetime of hydrogen in the planetary magnetosphere was incorporated into the earlier Titan torus model of Smyth (1981) and its expected impact discussed. A particle trajectory model for cometary hydrogen is presented and applied to the Lyman-alpha distribution of Comet Kohoutek (1973XII). M.G.

N85-13760*# Stanford Univ., Calif. Div. of Applied Mechanics.
MAGNETOHYDRODYNAMIC AND GASDYNAMIC THEORIES FOR PLANETARY BOW WAVES
John R. Spreiter and Stephen S. Stahara [1983] 71 p refs
(Grant NAGw-2781)
(NASA-CR-174135; NAS 1.26:174135) Avail: NTIS HC A04/MF A01 CSCL 03B

A bow wave was previously observed in the solar wind upstream of each of the first six planets. The observed properties of these bow waves and the associated plasma flows are outlined, and those features identified that can be described by a continuum magnetohydrodynamic flow theory. An account of the fundamental concepts and current status of the magnetohydrodynamic and gas dynamic theories for solar wind flow past planetary bodies is provided. This includes a critical examination of: (1) the fundamental assumptions of the theories; (2) the various simplifying approximations introduced to obtain tractable mathematical problems; (3) the limitations they impose on the results; and (4) the relationship between the results of the simpler gas dynamic-frozen field theory and the more accurate but less completely worked out magnetohydrodynamic theory. Representative results of the various theories are presented and compared. R.S.F.

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N85-13761*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
INTERPLANETARY RADIO STORMS. 2: EMISSION LEVELS AND SOLAR WIND SPEED IN THE RANGE 0.05-0.8 AU
J.-L. Bougeret, J. Fainberg, and R. G. Stone Dec. 1982 34 p refs
(NASA-TM-84946; NAS 1.15:84946) Avail: NTIS HC A03/MF A01 CSCL 03B

Storms of interplanetary type III radio bursts (IP storms) are commonly observed in the interplanetry medium by the ISEE-3 radio instrument. This instrument has the capability of accurately determining the arrival direction of the radio emission. At each observing frequency, the storm radio sources are tracked as they cross the line-of-sight to the Sun. Usng a simple model, the emission levels are determined at a number of radio frequencies for four separate storms. The IP storm radiation is found to occur in regions of enhanced density at levels of 0.05 to 0.8 AU. The density in these enhancements falls off faster than R(-2). The solar wind speed in the storm region is also measured. The analysis is consistent with steady conditions in the storm region during a few days around the central meridian passage of the storm. The comparison with average in situ density measurements compiled from the HELIOS 1-2 observations favors type III storm burst radio emission at the harmonic of the local plasma frequency. M.G.

N85-13762*# Smithsonian Astrophysical Observatory, Cambridge, Mass.
TIME DEPENDENT EFFECTS AT THE FOOT OF THE CHROMOSPHERE Final Report
Wolfgang Kalkofen Nov. 1984 4 p
(Grant NAGw-253)
(NASA-CR-174143; NAS 1.26:174143) Avail: NTIS HC A02/MF A01 CSCL 03B

A dynamical model was proposed which is in agreement with the observations that suggest the solar chromosphere is heated preferentially in magnetic regions. The dynamical model requires an energy flux that is large enough to lead to amplitudes for which the apparent temperatures match the empirical line temperatures in the UTV lines. Consistency with the observations of chromospheric emission then requires that the emission take place not uniformly over the solar surface but in smaller spatial regions. R.S.F.

N85-13312# Specola Vaticana (Vatican City).
FR. ANGELO SECCHI, A PIONEER IN THE STUDY OF SOLAR-TERRESTRIAL RELATIONSHIPS
Juan Casanovas *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 59-62 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13313# Astronomical Inst., Utrecht (Netherlands).
SPACE OBSERVATIONS OF SOLAR FLARES
C. DeJager *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 63-68 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13314# Space Research Astronomical Observatory, Utrecht (Netherlands). Space Research Lab.
PARTICLE ACCELERATION IN TWO-RIBBON FLARES
Zdenek Svestka *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 69-81 refs (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

N85-13342# Institut Royal Meteorologique de Belgique, Brussels.
SOLAR RADIATION IN THE OZONE LAYER [RADIATION SOLAIRE DANS LA COUCHE D'OZONE]
M. Nicolet *In* Observatorio del Ebro Sci. Contrib. in Commemoration of Ebro Observatory's 75th Anniv. 1983 p 419-428 refs In FRENCH (For primary document see N85-13308 04-42)
Avail: NTIS HC A23/MF A01

93 SPACE RADIATION

Includes cosmic radiation; and inner and outer Earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N85-13763# Los Alamos Scientific Lab., N. Mex.
SUPERNOVA ENVELOPE SHOCK ORIGIN OF COSMIC RAYS: A REVIEW
Stirling A. Colgate 1984 36 p refs Presented at the 25th Plenary Session of COSPAR, Graz, 24-30 Jun. 1984
(Contract W-7405-eng-36)
(DE84-016479; LA-UR-84-2517; CONF-8406167-4) Avail: NTIS HC A03/MF A01

The hydrodynamic shock origin of cosmic rays in the envelope of a Type I presupernova star is reviewed. The possibility of accelerating ultrahigh energy particles to greater than or equal to 10(18) eV is unique to the shock mechanism and currently no other suggested galactic or extragalactic site is likely. A review of the work leading to a renewed commitment to the origin of cosmic rays in the shock ejected envelope of supernova is given. The degree to which this interpretation applies to the origin of all cosmic rays is certainly uncertain and does not exclude the possibility of a fraction of the lower energy cosmic rays being accelerated in collisionless plasma shocks in the interstellar medium. DOE

N85-13764# Sandia Labs., Albuquerque, N. Mex.
LABORATORY ELECTRON BEAM SIMULATION OF COSMIC RADIO JETS
Robert G. Spulak, Jr. and Jack O. Burns (New Mexico Univ., Albuquerque) 1984 15 p refs Presented at a Workshop on Phys. of Energy Transport in Extragalactic Radio Sources, Green Bank, W. Va., 30 Jul. 1984
(Contract DE-AC04-76DP-00789)
(DE84-016179; SAND-84-1780C; CONF-840791-1) Avail: NTIS HC A02/MF A01

Astrophysical jets are injections of particles, magnetic fields, and possibly large-scale currents into a background plasma, the intergalactic medium. In principle, they are therefore somewhat similar to the laboratory injection of an electron beam into a plasma. Scaling between the astrophysical and laboratory cases are considered and the similarities and differences between them discussed. Aspects of the physics of astrophysical jets are investigated with electron beam experiments; in general, the laboratory will be most useful to study purely electrodynamic effects. DOE

99 GENERAL

N85-13765*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
RESEARCH AND TECHNOLOGY, 1984: MARSHALL SPACE FLIGHT CENTER Annual Report
Tauna W. Moorehead, ed. Nov. 1984 137 p
(NASA-TM-86476; NAS 1.15:86476) Avail: NTIS HC A07/MF A01 CSCL 05B

The Marshall Space Flight Center conducts research programs in space sciences, materials processing in space, and atmospheric sciences, as well as technology programs in such areas as propulsion, materials, processes, and space power. This Marshall Space Flight Center 1984 Annual Report on Research and Technology contains summaries of the more significant scientific and technical results obtained during FY-84. Author

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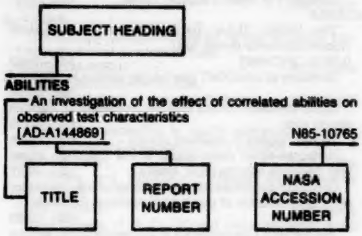
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Aeronautical Engineering, a continuing bibliography with indexes [NASA-SP-7037(180)] N85-12858
A bibliography of publications on corrosion and oxidation from UK government laboratories at Teddington, 1924 - 1983 [NPL-DMA(A)-82] N85-13004
Bibliography of US patents on augmentation of convective heat and mass transfer, part 2 [DE84-014865] N85-13178
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Economic value of consumer information: A selected, annotated bibliography [PB84-235795] N85-13673

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USSR report: Life Sciences: Biomedical and behavioral sciences [JPRS-UBB-84-026] N85-13457

BIONICS
USSR report: Life sciences. Biomedical and behavioral sciences [JPRS-UBB-84-025] N85-13453

BIOSPHERE
International Geosphere/Biosphere Program: 1984 [GPO-39-222] N85-13691

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USSR report: Life sciences. Biomedical and behavioral sciences [JPRS-UBB-84-025] N85-13453

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Progress in the development of a two-fluid model of turbulence for near-wall flows, part 1 [CFD/84/7-PT-1] N85-13196
Progress in the development of a two-fluid model of turbulence for near-wall flows. Part 3: Preliminary investigation of a stably-stratified boundary layer [CFD/84/9-PT-3] N85-13197

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Natural laminar flow airfoil design considerations for winglets on low-speed airplanes [NASA-CR-3853] N85-12863

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[PB84-237056] N85-13441
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EBT electron energy confinement experiments
[DE84-015402] N85-13613
Proceedings of the US-Japan Theory Workshop on 3-D MHD Studies
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Fiber optic data bus using Frequency Division Multiplexing (FDM) and an asymmetric coupler
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[NASA-TM-87391] N85-12887
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Open cycle OTEC thermal-hydraulic systems analysis and parametric studies
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CO-2-silica geothermometer for low temperature geothermal resource assessment, with application to resources in the Safford Basin, Arizona
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Modern structural materials. Present situation and evolution prospects — aircraft materials
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Optimization of the injection process for thermostatic polyether-ether-ketone (Peek) thermoplastics reinforced with short carbon fibers
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[BMFT-FB-T-84-179] N85-13039
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Criss-cross directory of NASA N numbers and DOD AD numbers, 1962-1978 N85-13669
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Liquid hydrocarbon fuels from syngas
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U: The universal utility controller, revision 1
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[JPRS-CST-84-003] N85-13132
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[ISBN-951-38-1998-1] N85-13681
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[PB84-227651] N85-13485
Digital Equipment Corp., MICRO/PDP-11, COBOL-81 version 2.2
[PB84-227644] N85-13486
C3, Incorporated, C50 System, C3 COBOL/75 version 2.00
[PB84-228006] N85-13488
Burroughs Corporation B26-CPU, B20 COBOL, Release 4.0
[PB84-216241] N85-13505
Burroughs Corporation B26-CPU, B20 COBOL Version 4.0 (COBOL technical report)
[PB84-216258] N85-13506
Convergent technologies NGEN CP001, CT COBOL Version 9.0
[PB84-216266] N85-13507
Convergent Technologies, Incorporated, NGEN CP001, CT COBOL Version 9.0 (COBOL technical report)
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Computer Sciences Corporation UNIVAC 1100/80, CSTS COBOL Release COB250
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Gould Incorporated, GOULD Concept 32/87, COBOL release 1.4
[PB84-227669] N85-13484
Digital Equipment Corp., VAX/750, VAX COBOL version 3.0
[PB84-227651] N85-13485
Digital Equipment Corp., MICRO/PDP-11, COBOL-81 version 2.2
[PB84-227644] N85-13486
Prime Computer, Inc., PRIME 750, FORTRAN-77 revision 19.4
[PB84-227628] N85-13487
C3, Incorporated, C50 System, C3 COBOL/75 version 2.00
[PB84-228006] N85-13488
Burroughs Corporation B26-CPU, B20 COBOL, Release 4.0
[PB84-216241] N85-13505
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[PB84-216258] N85-13506
Convergent technologies NGEN CP001, CT COBOL Version 9.0
[PB84-216266] N85-13507
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Digital image processing; report from a conference and study trip to the USA and Canada, summer 1984
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International Geosphere/Biosphere Program: 1984
[GPO-39-222] N85-13691
Space telescope cost, schedule, and performance review, 1984
[GPO-39-065] N85-13698

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Digital Equipment Corp., MICRO/PDP-11, COBOL-81 version 2.2
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Prime Computer, Inc., PRIME 750, FORTRAN-77 revision 19.4
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Convergent Technologies, Incorporated, NGEN CP001, CT COBOL Version 9.0 (COBOL technical report)
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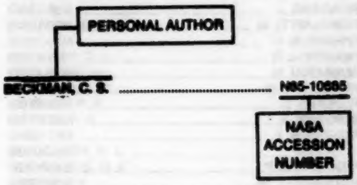

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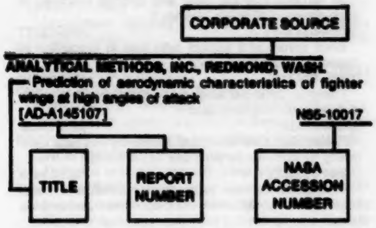
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[H-REPT-98-1078] N85-13688
International Geosphere/Biosphere Program: 1984
[GPO-39-222] N85-13691
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Calms processor (CALMPRO) user's guide
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ENVIRONMENTAL PROTECTION AGENCY, RESEARCH TRIANGLE PARK, N.C.
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EUROPEAN SPACE AGENCY. EUROPEAN SPACE RESEARCH AND TECHNOLOGY CENTER, ESTEC, NOORDWIJK (NETHERLANDS).
A transmission analysis for the use of 2-4 PSK modulation in satellite broadcasting
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FORSCHUNGSINSTITUT FUER HOCHFREQUENZPHYSIK, WERTHHOVEN (WEST GERMANY).
Anglo-German millimeter wave backscatter measurements on snow, environmental data report
[REPT-7-84] N85-13136
A dynamical model for a towed linear sonar antenna
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GENERAL ELECTRIC CO., ST. PETERSBURG, FLA.
Effect of doping on the voltage holdoff performance of alumina insulators in vacuum
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GEORGE WASHINGTON UNIV., WASHINGTON, D.C.

Space medicine research publications: 1983-1984
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GOETTINGEN UNIV. (WEST GERMANY).

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INSTITUT FRANCO-ALLEMAND DE RECHERCHES, ST. LOUIS (FRANCE).

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INSTITUT ROYAL METEOROLOGIQUE DE BELGIQUE, BRUSSELS.

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Screw expander for light duty diesel engines N85-13242

INSTITUTE OF GEOLOGICAL SCIENCES, EDINBURGH (SCOTLAND).

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INSTITUTE OF SOUND AND VIBRATION RESEARCH, SOUTHAMPTON (ENGLAND).

A.A.D. engine noise evaluation N85-13241

INSTITUTO DE PESQUISAS ESPACIAIS, SAO PAULO (BRAZIL).

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Equivocation limits in Gaussian additive channels
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INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION, OGDEN, UTAH.

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INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS, PARIS (FRANCE).

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INTERNATIONAL SCIENTIFIC RADIO UNION, BRUSSELS (BELGIUM).

International coordination in scientific research N85-13311

INTERNATIONAL TRADE ADMINISTRATION, WASHINGTON, D.C.

US energy for the rest of the century, 1984 edition
[PB84-207406] N85-13393

IOWA STATE UNIV. OF SCIENCE AND TECHNOLOGY, AMES.

Critical evaluation of binary rare Earth diagrams
[DE84-014880] N85-12991

Bibliography of US patents on augmentation of convective heat and mass transfer, part 2
[DE84-014865] N85-13178

IOWA UNIV., IOWA CITY.

Reduction and analysis of data from the plasma wave instruments on the IMP-6 and IMP-8 spacecraft
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ISTITUTO NAZIONALE DI GEOFISICA, ROME (ITALY).

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J

JAVERIANA UNIV., BOGOTA (COLOMBIA).

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JBF SCIENTIFIC CORP., WILMINGTON, MASS.

Analysis of wind energy systems for selected electric utilities
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JET PROPULSION LAB., CALIFORNIA INST. OF TECH., PASADENA.

An experimental investigation of two-dimensional thrust augmenting ejectors, part 1
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An experimental investigation of two-dimensional thrust augmenting ejectors, part 2
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International test and demonstration of a 1-MW wellhead generator: Helical screw expander power plant
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Ocean services user needs assessment. Volume 1: Survey results, conclusions and recommendations [NASA-CR-174104] N85-13445
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Coastal Zone Color Scanner (CZCS): Imagery of near-surface phytoplankton pigment concentrations from the first coastal ocean dynamics experiment (CODE-1), March - July 1981 [NASA-CR-174169] N85-13447
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Tidal dissipation in the Earth and Moon from lunar laser ranging N85-13733

JOHNS HOPKINS UNIV., BALTIMORE, MD.
Lithospheric structure in the Pacific geoid [NASA-CR-174155] N85-13365
Nuclear moments and nuclear structure [DE84-015847] N85-13573

JOHNSON CONTROLS, INC., MILWAUKEE, WIS.
Performance of improved lead acid batteries for electric vehicles [DE84-015845] N85-13160

JOINT INST. FOR LAB. ASTROPHYSICS, BOULDER, COLO.
Outer atmospheres of giant and supergiant stars [NASA-CR-174165] N85-13703
RS CV sub n binary systems [NASA-CR-174164] N85-13704

JOINT PUBLICATIONS RESEARCH SERVICE, ARLINGTON, VA.
East Europe report: Science and technology [JPRS-ESA-84-041] N85-13090
Theory of information, automation in Czechoslovakia N85-13091
New YeS 1056 unified system computer model described N85-13092
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China report: Science and technology [JPRS-CST-84-003] N85-13132
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USSR report: Life sciences. Biomedical and behavioral sciences [JPRS-UBB-84-025] N85-13453
Climate-chamber experiments to improve pilots' work conditions N85-13454
Machine Mechanics Institute builds walking vehicle N85-13455
Rech-1 speech synthesizer for man-machine dialog N85-13456
USSR report: Life Sciences: Biomedical and behavioral sciences [JPRS-UBB-84-026] N85-13457
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China report: Science and technology [JPRS-CST-84-001] N85-13545
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KANSAS UNIV. CENTER FOR RESEARCH, INC., LAWRENCE.
The preliminary checkout, evaluation and calibration of a 3-component force measurement system for calibrating propulsion simulators for wind tunnel models [NASA-CR-174113] N85-12903
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PRIAMUS, a computer program for the calculation of thermophysical properties of gas mixtures containing O2, N2, CO, CO2, He, H2O, H2, CH4 [JUEL-1916] N85-13002

KROHNE MESSTECHNIK G.M.B.H. UND CO. K.G., DUISBURG (WEST GERMANY).
Magnetic inductive flowmeter for low conducting liquids [BMFT-FB-T-84-136] N85-13216

KYOTO UNIV. (JAPAN).
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LANGUAGE SERVICES, KNOXVILLE, TENN.
Theory of resistive ballooning modes in Tokamaks [DE84-015626] N85-13606
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Rotation of a tenuous plasma with a high toroidal velocity in a Tokamak [DE84-012990] N85-13615

LEITZ (ERNST) G.M.B.H., WETZLAR (WEST GERMANY).
Ion contrasting chamber for discrimination of grains and textures [BMFT-FB-T-84-151] N85-13036

LEWIS (JOHN S.) ASSOCIATES, INC., TUCSON, ARIZ.
A numerical investigation of planetesimal collision trajectories with a Moon accumulating in Earth orbit N85-13740

LIBRARY OF CONGRESS, WASHINGTON, D. C.
Summary and analysis of hearing on improving the research infrastructure at US universities and colleges [GPO-36-854] N85-13660

LISBON UNIV. (PORTUGAL).
Thermodynamic conditions of the Earth's atmosphere with pollution processes N85-13345

LOCKHEED MISSILES AND SPACE CO., HUNTSVILLE, ALA.
Possibilities of conjugating binary solutions for thermal energy storage [DE84-016704] N85-13392

LOS ALAMOS SCIENTIFIC LAB., N. MEX.
Space nuclear safety program [DE84-015074] N85-12939
Space nuclear safety program [DE84-015064] N85-12940
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Proceedings of a Workshop on Atmospheric Research Needs for the Western United States [DE84-015069] N85-13412
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Earthquake catalog for northern New Mexico [DE84-016984] N85-13416

Rio Grande rift: Problems and perspectives
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U: The universal utility controller, revision 1
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Space nuclear safety program
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[DE84-012661] N85-13595
Tomographic reconstruction of axially symmetric objects from a single radiograph
[DE84-016783] N85-13599
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Improved apparatus and techniques for high temperature and pressure deformation of crystalline materials
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[DE84-009979] N85-13633
Americium thermodynamic data for the EQ3/6 database
[DE84-017085] N85-13656
INFORM system 2-year plan, FY 1984-1985
[DE84-016044] N85-13674
Supernova envelope shock origin of cosmic rays: A review
[DE84-016479] N85-13763

LOUISIANA STATE UNIV., BATON ROUGE.
Physico-chemical investigation of some areas of fundamental significance to biophysics
[DE84-016385] N85-12999
Oscillator strengths for OII ions
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LUNAR AND PLANETARY INST., HOUSTON, TEX.
Activities at the Lunar and Planetary Institute
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Activities at the Lunar and Planetary Institute, introduction N85-13695
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NASA's SESAC report on research and analysis in space and Earth sciences N85-13697
Conference on the Origin of the Moon
[NASA-CR-174068] N85-13709

M

MACQUARIE UNIV., NORTH RYDE (AUSTRALIA).
Love and Rayleigh waves in irregular ground
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MARTIN MARIETTA AEROSPACE, DENVER, COLO.
Definition of technology development missions for early Space Station satellite servicing. Volume 1: Executive summary
[NASA-CR-171228] N85-12922
Definition of technology development missions for early Space Station satellite servicing. Volume 2: Technical
[NASA-CR-171229] N85-12923
Evaluation of automated decisionmaking methodologies and development of an integrated robotic system simulation
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MARTIN MARIETTA CORP., BETHESDA, MD.
Selected tether applications in space: An analysis of five selected concepts
[NASA-CR-171222] N85-12921

MARYLAND UNIV., COLLEGE PARK.
Investigation of RF excited CW CO2 waveguide lasers
[NASA-CR-174106] N85-13221
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[NASA-CR-174173] N85-13468
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MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
High-temperature steam electrolysis: Technical and economic evaluation of alternative process designs
[DE84-015702] N85-12986
Structure and properties of grain boundaries
[DE84-014368] N85-13636

MASSACHUSETTS UNIV., AMHERST.
Climate of the Northern Hemisphere, 1851 - 1900 compared to contemporary climate
[DE84-016368] N85-13426

MAX-PLANCK-INST. FUER AERONOMIE, KATLENBURG-LINDAU (WEST GERMANY).
The winter anomaly in ionospheric absorption (with special reference to the results obtained in Spain)
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MAX-PLANCK-INST. FUER CHEMIE, MAINZ (WEST GERMANY).
Constraints on the origin of the Moon from molybdenum and other siderophile elements N85-13718
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MAX-PLANCK-INST. FUER QUANTENOPTIK, MUNICH (WEST GERMANY).
Improved sensitivities in laser interferometers for the detection of gravitational waves
[MPQ-88] N85-13232

MAX-PLANCK-INSTITUT FUER STROEMUNGSFORSCHUNG, GOETTINGEN (WEST GERMANY).
Energy transfer in atom-molecule scattering experiments in the 1eV region with SF6-Ar, CF4-Ne and Xe-CO2 systems as examples
[REPT-11/1983] N85-13588
Investigation on K (4 2P3/2) Hg interaction at collision energies from 0.5 to 5.7 eV
[MPIS-15/1983] N85-13589
Rotational inelastic scattering of He-atoms at HF-, HCl-, CF4-, SF6-, C2H6- and C2F6-molecules
[MPIS-9/1984] N85-13590

MCDONNELL-DOUGLAS ASTRONAUTICS CO., HUNTINGTON BEACH, CALIF.
The human role in space. Volume 1: Executive summary
[NASA-CR-171223] N85-13473
The human role in space. Volume 2: Research analysis and technology report
[NASA-CR-171224] N85-13474
The human role in space. Volume 3: Generalizations on human roles in space
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MCDONNELL-DOUGLAS CORP., LONG BEACH, CALIF.
System status display information
[NASA-CR-172347] N85-12889

MICHIGAN UNIV., ANN ARBOR.
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MIDWEST RESEARCH INST., GOLDEN, COLO.
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Five year research plan, 1984-1988. Photovoltaics: Electricity from sunlight
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Transformation of two and three-dimensional regions by elliptic systems
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MONSANTO CO., DAYTON, OHIO.
Variability of major organic components in aircraft fuels. Volume 2: Illustrations
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MONSANTO RESEARCH CORP., MIAMISBURG, OHIO.
Thermal conductivity of iron/potassium percholate heat powder
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NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL, WASHINGTON, D. C.
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
Aeronautical Engineering, a continuing bibliography with indexes
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Electrokinetic potential and stability of SiC suspensions in electrolyte solutions
[NASA-TM-77492] N85-12984
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. HUGH L. DRYDEN FLIGHT RESEARCH CENTER, EDWARDS, CALIF.
A comparison of Wortmann airfoil computer-generated lift and drag polars with flight and wind tunnel results
[NASA-TM-86035] N85-12868
Test experience on an ultrareliable computer communication network
[NASA-TM-85915] N85-13514

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.
Launch summary for 1978 - 1982
[NASA-TM-87375] N85-12924
Petrologic model of the northern Mississippi embayment based on satellite magnetic and ground based geophysical data
[NASA-TM-85075] N85-13406
Documentation for the machine-readable version of the MK classification extension catalogue Morris-Kennedy (1983)
[NASA-TM-87372] N85-13491
Documentation for the machine-readable version of the Perth 75: A Catalogue of Positions of 2589 FK4 and FK4S Stars (Nikoloff and Hog 1982)
[NASA-TM-87376] N85-13492
Documentation for the machine-readable version of the AGK3 Star Catalogue of Positions and Proper Motions North of -2 deg .5 declination (Dieckvoss and Collaborators 1975)
[NASA-TM-87378] N85-13493
The 1984 ASEE-NASA summer faculty fellowship program (aeronautics and research)
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Numerical simulations of fission N85-13737
Interplanetary radio storms. 2: Emission levels and solar wind speed in the range 0.05-0.8 AU
[NASA-TM-84946] N85-13761

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LYNDON B. JOHNSON SPACE CENTER, HOUSTON, TEX.
The 1984 NASA/ASEE summer faculty fellowship program
[NASA-TM-87392] N85-13662
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA.
Local stability analysis for a planar shock wave
[NASA-TP-2387] N85-12864
Space Shuttle Orbiter trimmed center-of-gravity extension study. Volume 8: Effects of configuration modifications on the aerodynamic characteristics of the 140 A/B Orbiter at a Mach number of 5.97
[NASA-TM-72661-VOL-8] N85-12867
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[NASA-CR-172478] N85-13528
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[NASA-TM-86339] N85-13666

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.
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Static jet noise test results of four 0.35 scale-model QCGAT mixer nozzles
[NASA-TM-86871] N85-13551
Overview of waste heat utilization systems
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.
A preliminary study of numerical simulation of thermosolutal convection of interest to crystal growth
[NASA-TP-2394] N85-13175
Global matrix of thermospheric density values for selected solar/geomagnetic conditions and spacecraft orbital attitudes
[NASA-TM-86478] N85-13409
FY 1984 scientific and technical reports, articles, papers and presentations
[NASA-TM-86470] N85-13670
Research and technology, 1984: Marshall Space Flight Center
[NASA-TM-86476] N85-13765

NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.
Characterization of interlaminar crack growth in composites with the double cantilever beam specimen
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Selection, procurement and description of Salem Limestone samples used to study the effects of acid rain
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Comparison of wind derived from the LIMS (Limb Infrared Monitor of the Stratosphere) satellite instrument with rocket observations
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NATIONAL INST. OF METEOROLOGY, MADRID (SPAIN).
Distribution of total solar radiation in Spain
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NATIONAL INST. OF POLAR RESEARCH, TOKYO (JAPAN).
Geomagnetic secular variation at Ebro Observatory during the past 70 years N85-13331

NATIONAL OCEAN SURVEY, ROCKVILLE, MD.
Tide tables 1985, high and low water predictions, central and western Pacific Ocean and Indian Ocean
[PB84-238393] N85-13451

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, BOULDER, COLO.
Use of Ebro Observatory data at Word Data Center A for Solar-Terrestrial Physics N85-13310
Atlas of polar cap energetic particle observations. Volume 1: TIROS-N, 1 January 1979 - 28 February 1981
[PB84-233402] N85-13419
Measurement of range-resolved water vapor concentration by coherent CO2 differential absorption lidar
[PB84-236892] N85-13420
A feasibility study on the use of wind profilers to support Space Shuttle launches
[NASA-CR-3861] N85-13423
Weather research program report; FY 1983
[PB84-236694] N85-13440

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, SEATTLE, WASH.
Recent observations of tides and tidal currents from the northeastern Bering Sea shelf
[PB84-241785] N85-13452

NATIONAL OCEANOGRAPHIC DATA CENTER, WASHINGTON, D. C.
NODC/1983: National Oceanographic Data Center report
[PB84-222231] N85-13449

NATIONAL PARK SERVICE, WASHINGTON, D. C.
Selection, procurement and description of Salem Limestone samples used to study the effects of acid rain
[PB84-231067] N85-13088

NATIONAL PHYSICAL LAB., NEW DELHI (INDIA).
Middle atmospheric ionization. Observations and chemistry N85-13340

NATIONAL PHYSICAL LAB., TEDDINGTON (ENGLAND).
A bibliography of publications on corrosion and oxidation from UK government laboratories at Teddington, 1924 - 1983
[NPL-DMA(A)-82] N85-13004
Prediction of long term strength of glass reinforced plastics in wet environments
[NPL-DMA(A)-80] N85-13041
Detection of cracks in a plastics pipe joint by reflection holography
[NPL-DMA(A)-87/MOM-70] N85-13202
A simple, low cost potentiostat for corrosion studies
[NPL-DMA(A)-47] N85-13203
Non-linear data fitting for the analysis of creep rupture data on GRP materials in aggressive environments
[NPL-DMA(A)-79] N85-13261
Large transverse deflections of circular plates loaded symmetrically
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Least squares spline regression with block-diagonal variance matrices
[NPL-DITC-40/84] N85-13523

NATIONAL WEATHER SERVICE, GARDEN CITY, N.Y.
WXR (hydrologic weather wire and PLT product software package)
[PB84-237221] N85-13442

NEW MEXICO UNIV., ALBUQUERQUE.
Energy information exchange, 1983
[DE84-901446] N85-13680
Ge abundances in the lunar mantle and implications for the origin of the Moon N85-13721

NEWCASTLE-UPON-TYNE UNIV. (ENGLAND).
Implications of lunar palaeomagnetism for the origin of the Moon N85-13717

NORTH CAROLINA STATE UNIV., RALEIGH.
Physics on aircraft wakes
[NASA-CR-174105] N85-12871
Erosion of multiphase materials
[DE84-015816] N85-13018

NORTH CENTRAL FOREST EXPERIMENT STATION, ST. PAUL, MINN.
Homogeneous macroclimatic zones of the lake states
[PB84-215821] N85-13436
NORTH DAKOTA UNIV., GRAND FORKS.
Geothermal resource assessment for North Dakota
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NOTRE DAME UNIV., IND.
Microstructural effects in abrasive wear
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O

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[DE84-013567] N85-13055
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Investigation of an ejector heat pump by analytical methods
[DE84-016675] N85-13189
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Advancement of remote systems technology: Past perspectives and future plans
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Response of ferritic steels to nonsteady loading at elevated temperatures
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Minimal cut-set methodology for artificial intelligence applications
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Multigrid iteration solution procedure for solving three-dimensional sets of coupled equations
[DE84-016515] N85-13532
Multigrid iteration solution procedure for solving two-dimensional sets of coupled equations
[DE84-016554] N85-13533
Theory of resistive ballooning modes in Tokamaks
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Internal helical mode m = 1 of a Tokamak in the plateau and banana regimes
[DE84-015623] N85-13607
EBT electron energy confinement experiments
[DE84-015402] N85-13613
Proceedings of the US-Japan Theory Workshop on 3-D MHD Studies
[DE84-012019] N85-13620
Zero-current, high beta stelleration equilibria with rotational transform profile control
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Monte Carlo studies of transport in stellarators
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Flux-line pinning by the grain boundary in niobium bicrystals
[DE84-016868] N85-13638
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Experimental determination of the critical cavity radius in Fe-10% Cr for ion irradiation
[DE84-016570] N85-13646
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[DE84-016631] N85-13647
Linear harmonic analysis for Stirling machines and second law analysis of four important losses
[DE84-016595] N85-13655
Linear harmonic analysis of Stirling engine thermodynamics
[DE84-016646] N85-13657
OBSERVATORIO DEL EBRO, ROQUETAS (SPAIN).
Scientific contributions in commemoration of Ebro Observatory's 75th anniversary
[ISBN-84-00-05380-X] N85-13308
A directly obtained geomagnetic activity measure, J3 N85-13322
OBSERVATORIO GEOFISICO CENTRAL DE TOLEDO (SPAIN).
Structure of the crust and upper mantle of the Iberian continental platform N85-13350
OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES, PARIS (FRANCE).
Wall adaptation at Mach 1.2
[ONERA-RTS-26/3075-AY-402] N85-12873
First cryogenic test of the CAST 7 profile in the T2 wind tunnel. Comparison with calculations
[ONERA-RTS-58/1685-AY-035-D] N85-13682
OFFICE OF SOFTWARE DEVELOPMENT, FALLS CHURCH, VA.
Gould Incorporated, GOULD Concept 32/87, COBOL release 1.4
[PB84-227669] N85-13484
Digital Equipment Corp., VAX/750, VAX COBOL version 3.0
[PB84-227651] N85-13485
Digital Equipment Corp., MICRO/PDP-11, COBOL-81 version 2.2
[PB84-227644] N85-13486
Prime Computer, Inc., PRIME 750, FORTRAN-77 revision 19.4
[PB84-227628] N85-13487
C3, Incorporated, C50 System, C3 COBOL/75 version 2.00
[PB84-228006] N85-13488
United Information Services, Inc., CRAY 1-S/2000, FORTRAN CFT 1.10
[PB84-227685] N85-13512
OHIO UNIV., ATHENS.
Realistic localizer courses for aircraft instrument landing simulators
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OPCOA, INC., SANTA ANA, CALIF.
Fiber optic, Fabry-Perot high temperature sensor
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OREGON STATE UNIV., CORVALLIS.
An alternative to reduction of surface pressure to sea level
[NASA-CR-174174] N85-13422
OSLO UNIV. (NORWAY).
Dayside cusp aurora N85-13333
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Self-tuning control of offset: A unified approach
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Long-range predictive control using weighting-sequence models
[OUEL-1542/84] N85-13521

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Atmospheric tracer experiments in a deep narrow valley
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PARIS-SUD UNIV., ORSAY (FRANCE).
Focusing effects of a laser beam in the nonresonant multiphoton ionization (MPI) of gases
[LP-207] N85-13231
PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.
Structural properties of amorphous metals by Raman scattering
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Velocity-changing collisional effects in nonlinear atomic spectroscopy and photon echo decay in gases
[NASA-CR-174159] N85-13559
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Electrochemical investigations of novel electrode materials
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Positron ring system using Anger-type detectors
[DE84-016788] N85-13212
PHYSIKALISCH-TECHNISCHE BUNDESANSTALT, BRUNSWICK (WEST GERMANY).
On experimental equations of state for Boson gases
[PTB-ME-61] N85-13659
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The problem of iron partition between Earth and Moon during simultaneous formation as a double planet system N85-13744
PLANETARY SCIENCE INST., TUCSON, ARIZ.
Stochastic does not equal ad hoc N85-13741
An integrated dynamical and geochemical approach to lunar origin modelling N85-13748
Lunar origin: role of giant impacts N85-13749
Models of angular momentum input to a circumterrestrial swarm from encounters with heliocentric planetesimals N85-13750
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Study of the structure of turbulent shear flows at supersonic speeds and high Reynolds number
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Photoelectrochemistry with chemically modified electrodes
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Effects of changing the signs of rows and columns of a matrix and the hyperholic transpose
[DE84-014651] N85-13530
PURDUE UNIV., LAFAYETTE, IND.
Correlation and reassessment of the OTEC plant power cycle
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Tests and modeling for sintering theory
[DE84-015110] N85-13012
Localized corrosion and stress corrosion cracking behavior of stainless steel weldments
[DE84-016095] N85-13017
RESEARCH INST. OF NATIONAL DEFENCE, LINKOEPING (SWEDEN).
Digital radio link: Wave propagation measurements using narrow band technique
[FOA-C-30364-E2] N85-13152
Digital image processing; report from a conference and study trip to the USA and Canada, summer 1984
[FOA-C-30369-E1] N85-13153
Pulse injection on a power cable penetrating a shielding wall by feed-through capacitors
[FOA-C-30372-A3] N85-13171
RESEARCH INST. OF NATIONAL DEFENCE, STOCKHOLM (SWEDEN).
Official journey to USA, November 1983. Symposium on the Compatibility of Explosives; Mound Laboratory; Naval Surface Weapons Center
[FOA-C-20546-D1] N85-13072
Laser for determining the ignition conditions of a pyrotechnic mixture
[FOA-C-20542-D1] N85-13230
Experiments with hydrox at 1.3 MPa (13 atm)
[FOA-C-58014-H1] N85-13471
Dynamic decision making
[FOA-C-53015-H2] N85-13688
RESEARCH INST. OF NATIONAL DEFENCE, UMEA (SWEDEN).
Method for evaluating petrol products corrosivity using piezoelectric crystals. Part 2: Instruction manual
[FOA-C-40198-B4] N85-13073
RESEARCH TRIANGLE INST., RESEARCH TRIANGLE PARK, N.C.
Comprehensive silicon solar cell computer modeling
[NASA-CR-174151] N85-13386

RICE UNIV., HOUSTON, TEX.
Electron spin polarization effects in low energy electron diffraction, ion neutralization and metastable atom deexcitation at solid surfaces
[DE84-016550] N85-13649
Laboratory studies of atomic collision processes of importance in planetary atmospheres
[NASA-CR-174142] N85-13758
ROCHESTER UNIV., N. Y.
Low energy ion-molecule reaction dynamics and chemiionization kinetics
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Brillouin scattering in underdense UV laser-produced plasmas
[DE84-015184] N85-13614
ROCKWELL INTERNATIONAL CORP., GOLDEN, COLO.
Evaluation of thermocouple junction temperature
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ROCKWELL INTERNATIONAL SCIENCE CENTER, THOUSAND OAKS, CALIF.
Study program for encapsulation materials interface for Flat-plate Solar Array (FSA) project
[NASA-CR-174152] N85-13385
ROHDE AND SCHWARTZ, MUNICH (WEST GERMANY).
Development of a feasibility model for a thin-film precision power meter
[BMFT-FB-T-84-161] N85-13217
ROLLS-ROYCE LTD., DERBY (ENGLAND).
Turbomachinery blade design using advanced calculation methods
[PNR-90218] N85-12896
Incorporation of viscous-inviscid interactions in turbomachinery design
[PNR-90219] N85-12897
Modelling viscous flow in turbomachinery
[PNR-90220] N85-12898
ROME UNIV. (ITALY).
Search for the radiative decay of a cosmic relic particle with IUE
[PREPRINT-410] N85-13707
ROYAL NETHERLANDS METEOROLOGICAL INST., DE BILT.
Acquisition and storage of Cabauw measurements: A system proposal
[KNMI-TR-48] N85-13434
Operational numerical forecasts: Survey and verification over the period 1978-1983
[KNMI-TR-49] N85-13435
ROYAL SIGNALS AND RADAR ESTABLISHMENT, MALVERN (ENGLAND).
The application of queueing theory to communications networks: A review
[AD-A146880] N85-13140
Implementing waveguide bandwidth six-port reflectometer circuits at millimetric wavelengths
[RSRE-MEMO-3678] N85-13155
Scattering from multi-scale surface
[RSRE-MEMO-3656] N85-13222
Heavy duty precision pan and tilt head
[AD-A146669] N85-13246
Software configuration management across project boundaries and in distributed development environments
[RSRE-MEMO-3704] N85-13494

S

SAN CALIXTO OBSERVATORY, LA PAZ (BOLIVIA).
Seismology today N85-13346
SAN FERNANDO MARINE OBSERVATORY, CADIZ (SPAIN).
Present practice for the recording of the Earth magnetic field N85-13317
SANDIA CORP., ALBUQUERQUE, N. MEX.
Gamma-induced leakage in junction field-effect transistors
[DE84-014990] N85-13634
SANDIA LABS., ALBUQUERQUE, N. MEX.
Investigation of the dissolution of CaCrO4 in molten LiCl-KCl eutectic
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Time-resolved spectroscopy of evanescent-wave excited fluorescence
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Electropulse chemical machining
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Analog disc recorder system: Operator's reference manual
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Determination sample sizes for diversified reliability test programs
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[DE84-016207] N85-13275
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Evaluation of some photovoltaic concentrator solar cell-heat sink coupling materials
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Tailored airfoils for vertical axis wind turbines
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Models for volcanic processes in Long Valley, California: Testing by continental drilling
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Expert systems in design and manufacture
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Boolean approach to zero-one linear programming
[DE84-016654] N85-13498
Users manual for BRGLM: Interactive general linear model regression, version 3
[DE84-017386] N85-13501
Conservation laws and the numerical solution of ODEs
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In-line beam current monitor
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Pulsed irradiaion of optimized, MBE grown, AlGaAs/GaAs radiation hardened photodiodes
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Electron and hole effective masses for two-dimensional transport in strained-layer superlattices
[DE84-016222] N85-13637
Single crystal semiconductor multilayers for electrically active optical interference filters
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SANTA CLARA UNIV., CALIF.
Advanced concepts for methanol fuel vehicles
[DE84-013612] N85-13071
SAR, INC., RIVERDALE, MD.
LANDSAT instruments characterization
[E85-10032] N85-13356
SCIENCE RESEARCH COUNCIL, SLOUGH (ENGLAND).
On the study of ionospheric disturbances N85-13335
SHEFFIELD UNIV. (ENGLAND).
Fundamental study of three dimensional two phase flow in combustion systems
[AD-A142886] N85-13177
SMITHSONIAN ASTROPHYSICAL OBSERVATORY, CAMBRIDGE, MASS.
A normal incidence, high resolution X-ray telescope for solar coronal observations
[NASA-CR-174145] N85-13699
Time dependent effects at the foot of the chromosphere
[NASA-CR-174143] N85-13762
SOCIETE NATIONALE INDUSTRIELLE AEROSPATIALE, LES MUREAUX (FRANCE).
Optimization of the injection process for thermostatic polyether-ether-ketone (Peek) thermoplastics reinforced with short carbon fibers
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Tests for susceptibility to electromagnetic attack
[SNIAS-842-422-101] N85-13154
Improvement of lightning arresters energy capability
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SOCIETE NATIONALE INDUSTRIELLE AEROSPATIALE, PARIS (FRANCE).
Tactical missiles technologies. Research and prospectives
[SNIAS-841-320-101] N85-12925
Electroforming of nickel
[SNIAS-841-501-101] N85-13085
SOCIETE NATIONALE INDUSTRIELLE AEROSPATIALE, SURESNES (FRANCE).
Modern structural materials. Present situation and evolution prospects
[SNIAS-842-551-101] N85-12886
Influence of relaxation on the mechanical characteristics of a carbon-epoxy composite. Report no. 45.427/1
N85-12980
Quality assurance of composite materials, test report no. 45-649/F N85-12981
Defect detection threshold in riveted joints, test report no.44-833/F N85-13260
SOCIETE NATIONALE INDUSTRIELLE AEROSPATIALE, TOULOUSE (FRANCE).
An electronic documentation system
[SNIAS-842-111-101] N85-13683
SOLAR SYSTEM ASSOCIATES, GREAT FALLS, VA.
Two lunar global asymmetries N85-13734
SPACE RESEARCH ASTRONOMICAL OBSERVATORY, UTRECHT (NETHERLANDS).
Particle acceleration in two-ribbon flares N85-13314
SPECIAL LIBRARIES ASSOCIATION, CHICAGO, ILL.
Criss-cross directory of NASA N numbers and DOD AD numbers, 1962-1978 N85-13669
SPECOLA VATICANA (VATICAN CITY).
Fr. Angelo Secchi, a pioneer in the study of solar-terrestrial relationships N85-13312
SPRINGBORN LABS., INC., ENFIELD, CONN.
Development of acceptance criteria for batches of silane primer for external tank thermal protection system bonding applications
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Electromagnetic shower development and applications to sampling calorimeters
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ASP: A new PEP experiment to measure single photons
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Parity and time-reversal non-conversation in atoms
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Galaxy and cluster formation in a universe dominated by cold dark matter
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A study of flow past an airfoil with a jet issuing from its lower surface
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Geology and geochemical evolution of the Lost River, Alaska, tin deposit N85-13405
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Magnetohydrodynamic and gasdynamic theories for planetary bow waves
[NASA-CR-174135] N85-13760
STATE UNIV. OF NEW YORK, ALBANY.
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Abundancies of Ni, Cr, CO and major elements in the silicate portion of the Moon: Constraints from primary lunar magmas N85-13720
STATE UNIV. OF NEW YORK, STONY BROOK.
Applications of synchrotron X-ray diffraction topography to fractography
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Stable isotope studies
[DE84-016752] N85-13583
STUTTGART UNIV. (WEST GERMANY).
Design and implementation of a modular program system for statistical analyses
[IKE-4-114] N85-13503
SYSTEMS APPLICATIONS, INC., SAN RAFAEL, CALIF.
Impact of alcohol fuels on urban air pollution: Methanol photochemistry study
[DE84-012950] N85-13397

T

TECHNICAL RESEARCH CENTRE OF FINLAND, ESPOO.
Instrumented impact testing machine with reduced specimen oscillation effects
[VTT-290] N85-13218
Activities report in technology
[ISBN-951-38-1998-1] N85-13681
TECHNISCHE HOCHSHULE, LEUNA-MERSEBURG (WEST GERMANY).
Interval-mathematical treatment of initial value problems of ordinary differential equations N85-13538
TECHNISCHE UNIV., BERLIN (WEST GERMANY).
Preparation of sinter-active silicon carbide powders
[BMFT-FB-T-84-189] N85-12982
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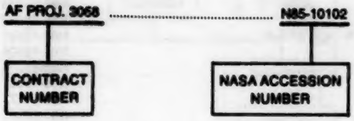

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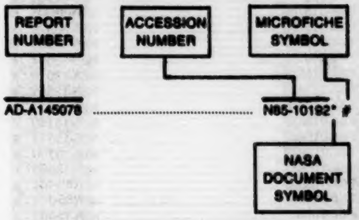

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